

**United States Department of the Interior  
Bureau of Land Management**

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**SDM 103180  
Wharf Expansion Project Plan of Operations  
Environmental Assessment  
DOI-BLM-MT-C040-2012-0015-EA**

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## EXECUTIVE SUMMARY

Wharf Resources (U.S.A.) Inc. submitted a Plan of Operations (POO) to the Bureau of Land Management (BLM) for the purpose of surface mining 0.74 acre of federal mineral claims located approximately 4 miles west of Lead, Lawrence County, South Dakota. The Expansion Project is adjacent to the existing Wharf Mine and includes areas of Golden Reward Mine that were formerly mined and reclaimed. Wharf's purpose for the Proposed Action is to provide for a continuation of orderly, efficient, environmentally responsible, and profitable mining of gold resources on BLM administered surface within the Wharf Mine Expansion Project.

Although the Expansion Project area covers 528 acres, the Proposed Action would disturb 0.12 acre of the 0.74 acre of BLM administered surface located within the Expansion Project permit boundary. The BLM administered lands that are within the federal mining claims within the Expansion Project area are similar to the adjacent mine for which detailed site-specific environmental data have been collected and for which environmental analyses have previously been prepared to secure the necessary state and county mining permits. Monitoring programs have been and are continually being conducted on the adjacent mine permit area.

Areas of the affected environment and environmental consequences were considered for numerous resources, including geology and mineral resources, surface disturbance, soils, groundwater, surface water, air quality, vegetation, wildlife and aquatic resources, cultural resources, noise, visual resources, land use, utilities and transportation, and socioeconomics. Environmental consequences to most resources will be minor or negligible under the Proposed Action because the Proposed Action affects less than 0.1 percent of the Expansion Project and mining would be conducted on adjacent lands under both the Proposed Action and No Action alternatives. The greatest positive effects of the Proposed Action are related to the temporary surface disturbance of the BLM administered surface, which if reclaimed as proposed, allows for the postmining benefit of enhanced recreational and economic opportunities in association with highwall reclamation. No significant issues were raised during scoping. Table ES-1 provides an overview of the environmental consequences (Chapter 3.0) and residual and cumulative effects (Chapter 4.0) by resource.

**Table ES-1. Overview of Environmental Consequences and Residual and Cumulative Effects (Page 1 of 2)**

Resource	Direct/Indirect Environmental Consequences (Chapter 3.0)	Residual and Cumulative Effects (Chapter 4.0)
Geology and Minerals <ul style="list-style-type: none"> <li>• Hazardous Materials/Waste</li> </ul>	Irreversible removal of gold resources. No hazardous material or spent ore would be placed within the BLM administered surface.	Cumulative loss of mineral resources, gain to local economy.
Soils and Topography	Changes to surface and topography during and after mining including highwall removal.	Temporary soil removal with permanent redistribution. Erosion control practices in place. Changes to surface and topography during and after mining.
Groundwater <ul style="list-style-type: none"> <li>• Water Quality</li> </ul>	Negligible. There are no water supply wells located within or adjacent to the BLM administered surface.	Postmining increase in nitrates are not expected to exceed the groundwater standard of 10 parts per million (ppm) outside the permitted mine areas.
Surface Water <ul style="list-style-type: none"> <li>• Water Quality</li> <li>• Wetlands</li> <li>• Floodplains</li> <li>• Wild and Scenic Rivers</li> </ul>	Negligible. There are no special hydrologic features associated with the BLM parcels located within the Wharf Expansion Project.	Minor decreases in stream flow and minor changes in water quality.
Air Quality	Negligible. Monitoring results indicate that there has been no significant deterioration of air quality caused by the current operation since 1985.	Particulate levels well within both federal and South Dakota PM-10 air-quality standards. Current mitigation measures in place.
Vegetation <ul style="list-style-type: none"> <li>• Threatened and Endangered Species</li> <li>• Invasive/Noninvasive Species</li> </ul>	Minor. No threatened or endangered species within the BLM administered surface.	Disturbance includes harvesting of trees and stripping of vegetation. Reclamation includes recontouring, resoiling, and revegetating. An active noxious weed control plan is in place.
Wildlife/Aquatic Resources <ul style="list-style-type: none"> <li>• Threatened and Endangered Species</li> </ul>	Negligible. No threatened or endangered species within the BLM administered surface.	Decrease in mountain sucker population on Annie Creek; habitat diversity benefits through reclaimed woodland grazing lands. Annual monitoring in place.
Cultural Resources <ul style="list-style-type: none"> <li>• Native American Religious Concerns</li> </ul>	Pursuant to [36 CFR 800.4(d)(1)], no historic properties affected.	There will be no effect to cultural resources within this analysis area provided that all eligible and potentially eligible historic properties, Traditional cultural properties, and culturally significant areas are avoided or have mitigation measures developed.

**Table ES-1. Overview of Environmental Consequences and Residual and Cumulative Effects (Page 2 of 2)**

Resource	Direct/Indirect Environmental Consequences (Chapter 3.0)	Residual and Cumulative Effects (Chapter 4.0)
Noise	Negligible. Proximity of existing residences with mining of BLM administered surface does not change. Mitigation measures in place.	Noise levels not anticipated to increase with Expansion Project. Mitigation measures in place.
Visual	Short-term view of mining could result in long-term visual enhancement and removal of highwalls during reclamation.	Reshaped topography and modified vegetation alter aesthetic view of area.
Land Use <ul style="list-style-type: none"> <li>• Farmland</li> <li>• Wilderness Areas</li> </ul>	Negligible. There are no prime and unique farmlands or wilderness areas within the project area.	Postmining land use of rangeland, recreation, industrial/commercial, and home sites provide benefits to habitat and economies.
Utilities/ Transportation	Negligible. No utilities or transportation alterations are anticipated on BLM administered surface.	Improvements to State Highway 473.
Socioeconomics/ Recreation	Increased postmining recreational opportunities and economic benefits associated with highwall removal.	Increased recreational opportunities and associated economic benefits.
Environmental Justice	Negligible. Lawrence County does not have a disproportionate share of minority populations or low-income populations.	Negligible. Lawrence County does not have a disproportionate share of minority populations or low-income populations.

# TABLE OF CONTENTS

<b>1.0 INTRODUCTION</b> .....	1
1.1 BACKGROUND .....	1
1.2 PURPOSE AND NEED .....	3
1.3 REGULATORY AUTHORITY AND RESPONSIBILITY .....	5
1.4 RELATIONSHIP TO POLICIES, PLANS, AND PROGRAMS .....	6
1.5 SCOPING AND CONSULTATIONS.....	6
<b>2.0 ALTERNATIVES, INCLUDING THE PROPOSED ACTION</b> .....	8
2.1 INTRODUCTION .....	8
2.2 PROPOSED ACTION (ALTERNATIVE A) .....	8
2.3 NO ACTION (ALTERNATIVE B).....	11
<b>3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES</b> .....	12
3.1 GENERAL SETTING .....	13
3.2 GEOLOGY AND MINERAL RESOURCES.....	13
3.2.1 Geology—Affected Environment.....	13
3.2.2 Geology—Environmental Consequences .....	14
3.3 SOILS AND TOPOGRAPHY.....	15
3.3.1 Soils and Topography—Affected Environment.....	15
3.3.2 Soils and Topography—Environmental Consequences.....	15
3.4 GROUNDWATER.....	16
3.4.1 Groundwater—Affected Environment.....	16
3.4.2 Groundwater—Environmental Consequences.....	18
3.5 SURFACE WATER.....	18
3.5.1 Surface Water—Affected Environment.....	19
3.5.2 Surface Water—Environmental Consequences .....	20
3.6 AIR QUALITY .....	20
3.6.1 Air Quality—Affected Environment .....	20
3.6.2 Air Quality—Environmental Consequences .....	21
3.7 VEGETATION .....	21
3.7.1 Vegetation—Affected Environment .....	21
3.7.2 Vegetation—Environmental Consequences .....	23
3.8 WILDLIFE AND AQUATIC RESOURCES .....	23
3.8.1 Wildlife and Aquatic Resources—Affected Environment.....	23
3.8.2 Wildlife and Aquatic Resources—Environmental Consequences.....	27
3.9 CULTURAL RESOURCES .....	27
3.9.1 Legislation and Resource Protection .....	27
3.9.2 Cultural Resources—Affected Environment.....	28
3.9.3 Cultural Resources—Environmental Consequences .....	29

## TABLE OF CONTENTS (Continued)

3.10 NOISE.....	30
3.10.1 Noise—Affected Environment.....	30
3.10.2 Noise—Environmental Consequences.....	31
3.11 VISUAL RESOURCES.....	31
3.11.1 Visual Resources—Affected Environment.....	31
3.11.2 Visual Resources—Environmental Consequences.....	32
3.12 LAND USE.....	32
3.12.1 Land Use—Affected Environment.....	33
3.12.2 Land Use—Environmental Consequences.....	33
3.13 UTILITIES AND TRANSPORTATION.....	33
3.13.1 Utilities and Transportation—Affected Environment.....	33
3.13.2 Utilities and Transportation—Environmental Consequences.....	34
3.14 SOCIOECONOMICS.....	34
3.14.1 Socioeconomics—Affected Environment.....	35
3.14.2 Socioeconomics—Environmental Consequences.....	35
3.15 ENVIRONMENTAL JUSTICE.....	36
3.15.1 Environmental Justice—Affected Environment.....	36
3.15.2 Environmental Justice—Environmental Consequences.....	37
<b>4.0 RESIDUAL AND CUMULATIVE EFFECTS.....</b>	<b>38</b>
4.1 PAST OR PRESENT ACTIONS.....	39
4.2 REASONABLY FORESEEABLE ACTIONS.....	40
4.3 RESIDUAL AND CUMULATIVE EFFECTS.....	40
<b>5.0 CONSULTATION AND COORDINATION.....</b>	<b>44</b>
5.1 INTRODUCTION.....	44
5.2 PUBLIC PARTICIPATION.....	44
5.3 LIST OF PREPARERS.....	45
<b>6.0 REFERENCES.....</b>	<b>47</b>
<b>APPENDIX A. SCOPING LETTERS.....</b>	<b>A-1</b>
<b>APPENDIX B. SCOPING RESPONSES.....</b>	<b>B-1</b>
<b>APPENDIX C. CULTURAL RESOURCES CONSULTATION LETTERS.....</b>	<b>C-1</b>

## LIST OF TABLES

TABLE	PAGE
ES-1 Overview of Environmental Consequences and Residual and Cumulative Effects....	ii
1-1 Affected Bureau of Land Management Mining Claims .....	3
5-1 List of Bureau of Land Management and Consultant Interdisciplinary Reviewers...	45

## LIST OF FIGURES

FIGURE	PAGE
1-1 Project Location Map .....	2
1-2 Expansion Project Located at Wharf Mine and Golden Reward Mine .....	4
2-1 Bureau of Land Management Mining Claims Within the Wharf Expansion Project .....	9

## LIST OF ABBREVIATIONS

ABA	Acid Base Accounting
ARSD	Administrative Rules of South Dakota
BHC	Black Hills Chairlift Company
BHM	Black Hills Meridian
BLM	Bureau of Land Management
CFR	Code of Federal Regulation
dBA	decibels
DR	Decision Record
EPA	Environmental Protection Agency
FONSI	Finding of No Significant Impact
GR	Golden Reward
LSMP	Large-Scale Mine Permit
MCL	maximum contaminant level
mg/L	milligrams per liter
MW	monitoring well
MWMT	Meteoric Water Mobility Tests
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
ppm	parts per million
POO	Plan of Operations
SARC	State Archaeological Research Center
SDCL	South Dakota Codified Law
SD GFP	South Dakota Game, Fish and Parks
SD DENR	South Dakota Department of Environment and Natural Resources
SD DOT	South Dakota Department of Transportation
SDNHP	South Dakota Natural Heritage Program
SHPO	South Dakota Historic Preservation Office
THPA	Tribal Historic Preservation Office
TSS	total suspended solids
U.S.C.	United States Code
USFS	U.S. Forest Service
WAD	weak-acid dissociable

## 1.0 INTRODUCTION

### 1.1 BACKGROUND

In July 2011, Wharf Resources (U.S.A.) Inc. (Wharf) submitted a Plan of Operations (POO) to the Bureau of Land Management (BLM) for the purpose of surface mining 0.74 acre of federal mineral claims located approximately 2.5 miles west of Lead, Lawrence County, South Dakota, in the Bald Mountain Mining District (see Figure 1-1). A list of these claims is provided in Table 1-1 and a copy of the POO is available by contacting either the South Dakota or Miles City BLM offices. Generally, these BLM claims and sites came under federal authority as a result of survey errors which resulted in small unclaimed parcels between lands already under a land patent or Homestead Act claim. The 0.74 acre is part of a preliminary land purchase process initiated between Wharf and the BLM.

The claims are located within the 528-acre Wharf Mine Expansion Project. The state Large-Scale Mine Permit (LSMP) application was approved by the South Dakota Board of Minerals and Environment in November 2011 and the Lawrence County Office of Planning and Zoning in June 2011 [Wharf Resources, 2011b]. The state LSMP application and associated baseline environmental reports are available online (<http://denr.sd.gov/des/mm/wharfpge.aspx>) through the South Dakota Department of Environment and Natural Resources (SD DENR).

The Expansion Project is adjacent to the existing Wharf Mine and includes areas of Golden Reward Mine that were formerly mined and reclaimed. A map of the Expansion Project is shown in Figure 1-2. The permit application provides for a continuation of current operations to include 279 acres of mining area, 17 acres for topsoil stockpiles, and 8 acres for haulage routes and roads. The additional mine areas would provide approximately 7 years of continuation of the current permitted life of the Wharf Mine.

The lands in the BLM federal mining claims within the Expansion Project area are similar to the adjacent mine for which detailed site-specific environmental data have been collected and for which environmental analyses have previously been prepared to secure the necessary state and county mining permits. Monitoring programs have been and are continually being conducted on the adjacent mine permit area.

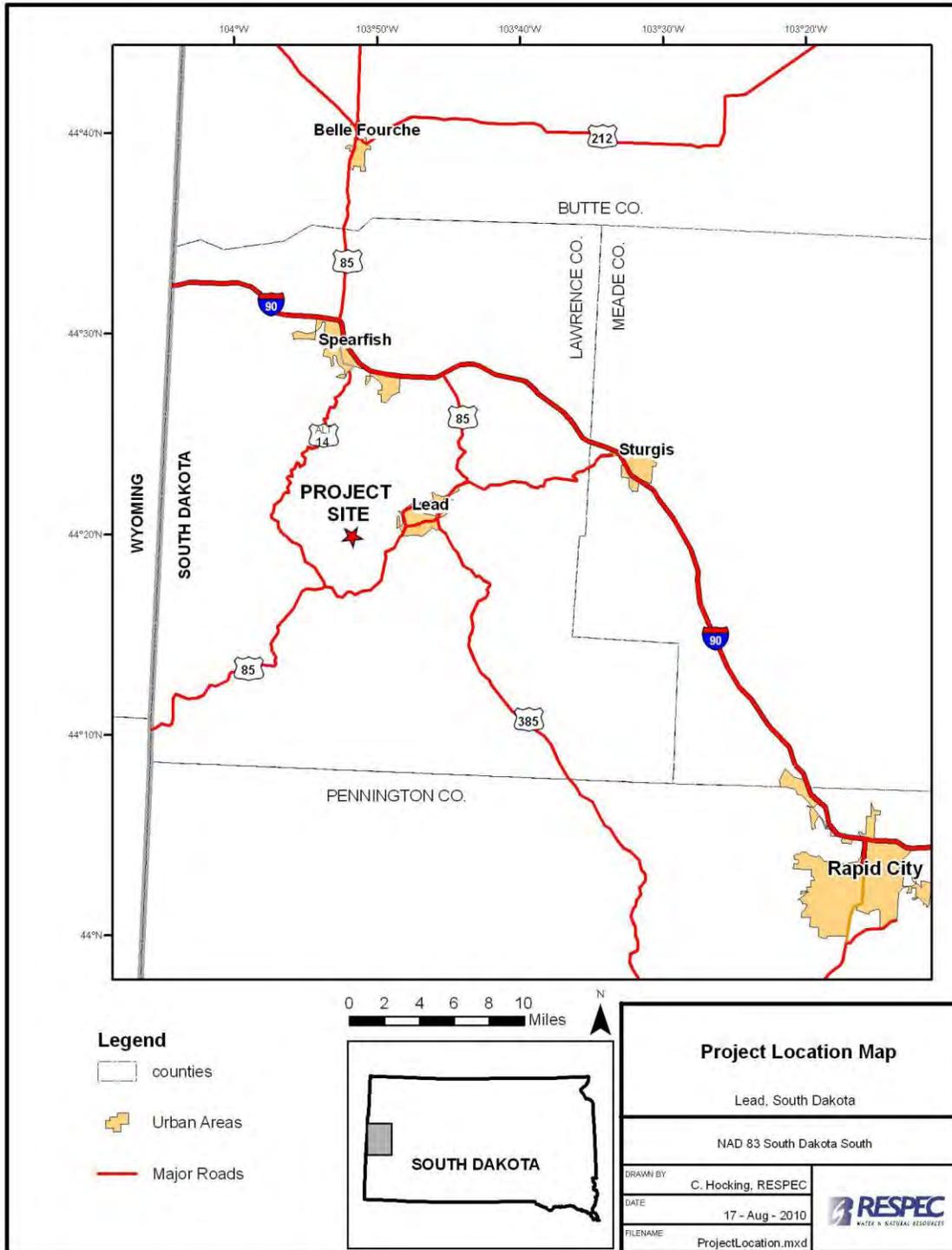


Figure 1-1. Project Location Map.

**Table 1-1. Affected Bureau of Land Management Mining Claims**

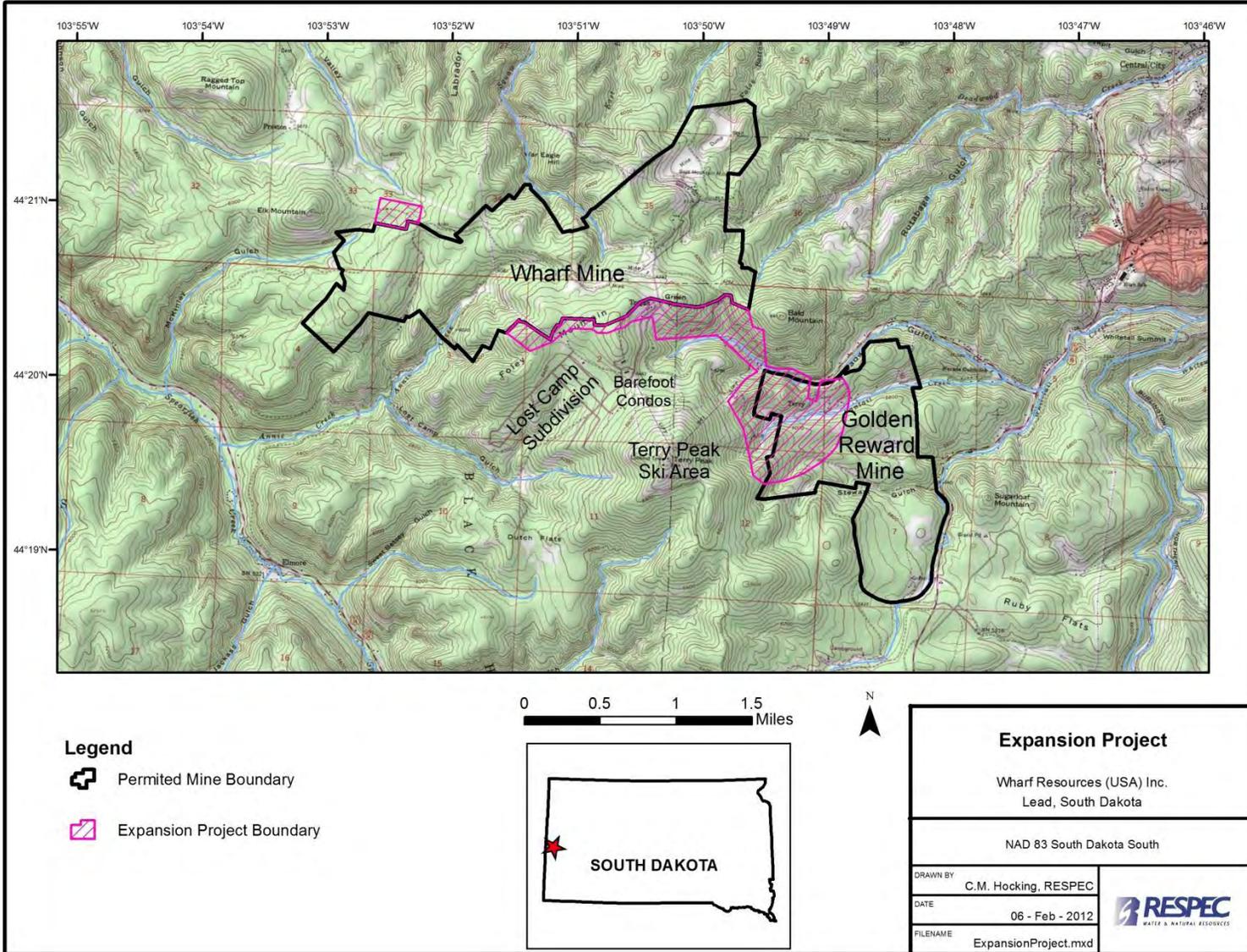
<b>Claim (Tract)</b>	<b>BLM Serial No.</b>	<b>Government Lot (Sec-T-R)</b>	<b>Owner Surface</b>	<b>Owner Mineral</b>	<b>Within New Disturbance or Permit Boundary</b>	<b>Total Acres</b>
Gremlin No. 3	193323	Lots 2 and 14, Sec. 1-T4N-R2E	BHC/BLM	GR	Disturbance	0.08
Gremlin No. 4	193324	Lots 12 and 13, Sec. 12-T4N-R2E	BLM	GR	Disturbance	0.02
Baby	132782	Lot 26, Sec. 1-T4N-R2E	BLM	GR	Disturbance	0.02
<b>Subtotal Disturbance</b>						<b>0.12</b>
Caitlin No. 3	222711	Lot 19, Sec. 1-T4N-R2E	BLM	GR	Permit	0.17
Golden Reward No. 15	94456	Lot 12, Sec. 1-T4N-R2E	BLM	GR	Permit	0.38
Golden Reward No. 16	94457	Lot 10, Sec. 1-T4N-R2E	BLM	GR	Permit	0.07
<b>Subtotal Mine Permit</b>						<b>0.62</b>
<b>TOTAL</b>						<b>0.74</b>

BLM = Bureau of Land Management  
 BHC = Black Hills Chairlift Company  
 GR = Golden Reward Mining Company

## 1.2 PURPOSE AND NEED

The purpose and need for the BLM is to evaluate and respond to Wharf's proposal contained in the POO. The purpose and need for Wharf is to provide for a continuation of orderly, efficient, and environmentally responsible mining of gold resources on BLM administered surface within the Wharf Mine Expansion Project. These BLM lands are open to mineral entry, and mining claims have been filed on them (Table 1-1), which may be mined and developed in accordance with relevant laws and regulations.

Gold has a unique combination of properties that makes it a vital component in many medical, industrial, and electrical applications, as well as popular for jewelry and investment.



**Figure 1-2.** Expansion Project Located at Wharf Mine and Golden Reward Mine.

### **1.3 REGULATORY AUTHORITY AND RESPONSIBILITY**

Metallic mineral deposits, such as gold, has been determined to be locatable under the General Mining Law of May 10, 1872, as amended (30 United States Code (U.S.C.) 22-54 and 611-615), the federal regulations, which are used to regulate locatable mineral exploration and development on BLM administered public lands, are called the Surface Management of Mining Clams Under the General Mining Law, found at 43 CFR 3809, which are commonly referred to as the “3809” regulations. These regulations require mining claimants and/or operators to submit a POO for BLM’s review and approval. The plan must contain detailed information about the mining proposal and protective measures so that “Unnecessary or Undue” degradation does not occur to the federal lands. The operator must also comply with the performance standards set forth in 43 CFR 3809.420.

The regulations at 43 CFR 3809.411 directs BLM to prepare an environmental review under the National Environmental Policy Act (NEPA) for a new POO or a substantial modification to an existing plan. This environmental assessment was prepared by a third-party contractor following guidance from the BLM National Environmental Policy Handbook (H-1790-1). This environmental assessment was prepared in accordance with NEPA for projects involving federal lands. The Proposed Action is consistent with other local, state, and federal regulations including but not limited to the following.

#### **Federal**

- Federal Land Policy and Management Act of 1976, as amended (43 U.S.C. 1701 et seq.)
- Surface Management Regulations (43 Code of Federal Regulations (CFR) 3809)
- Clean Air Act (42 U.S.C. 1857 et seq.), as amended and recodified (42 U.S.C. 7401 et seq.)
- Clean Water Act (33 U.S.C. 1251 et seq.)
- Endangered Species Act (16 U.S.C. 1531 et seq.)
- Migratory Bird Treaty Act (16 U.S.C. 703 et seq.)
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.)
- Native American Graves Protection and Repatriation Act of 1990 and 43 CFR 10
- American Indian Religious Freedom Act of 1978
- Executive Order 11593 of 1971
- Executive Order 13175 of 2000
- U.S. Fish and Wildlife Service Bald and Golden Eagle Protection Act, as amended

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- Protection of Historic Properties (36 CFR 800)
- BLM NEPA Handbook 1790-1.

#### **State**

- South Dakota Mined Land Reclamation Act (South Dakota Codified Law (SDCL) 45-6B)
- South Dakota Mine Land Reclamation Regulations (Administrative Rules of South Dakota (ARSD) 74:29).

#### **Local**

- Lawrence County Zoning Ordinance (Chapter 20).

### **1.4 RELATIONSHIP TO POLICIES, PLANS, AND PROGRAMS**

The Proposed Action and alternatives are consistent with other plans, programs, and policies of affiliated Tribes, other federal agencies, state agencies, and local governments to the extent practical, including but not limited to the following:

#### **Federal**

- South Dakota Resource Management Plan [Bureau of Land Management, 1986]—The current South Dakota Resource Management Plan/Environmental Impact Statement was approved in April 1986 and was written in conformance with BLM standards and 43 CFR 1610.5. Under this plan, it is noted that “private industry is encouraged to explore and develop federal minerals” and “provides for economically and environmentally sound exploration, extraction and reclamation practices.”

#### **Local**

- Lawrence County Planning & Zoning Board Conditional Use Permit (granted June 2011)
- Lawrence County Comprehensive Plan [1998].

### **1.5 SCOPING AND CONSULTATIONS**

The BLM reviewed the POO and conducted internal scoping between July and December 2011. In accordance with requirements for agency consultation and coordination of the NEPA process, appropriate agencies and interested parties were contacted regarding the project. A scoping notice was prepared and submitted to the public by the BLM on November 26, 2011,

requesting input to the proposed Wharf Mine Expansion Project. A notice was published in the *Rapid City Journal* on November 26, 2011. Scoping letters were sent to agencies on November 30, 2011, with a request for response within 30 days of receipt. The BLM provided notice of the project to ten Tribes in South Dakota, Montana, and North Dakota on December 8, 2011. The list of those contacted is provided in Chapter 5.0 of this document. A copy of the news release, agency and Tribe address lists, and scoping letters are included in Appendix A.

In response, the BLM received three scoping comments (see Appendix B). The first comment was from the South Dakota Game, Fish and Parks (SD GFP) who inquired about the subject parcels and the reason those parcels were not involved in a land exchange process. The second comment was from the Northern Cheyenne Tribe, who indicated they have no interest in the project. The Lawrence County Commissioners submitted a letter of support for the project. No significant issues were raised during external scoping.

The South Dakota State Historic Preservation Office (SHPO) was also consulted (see Section 3.10). The SHPO concurred with BLM's determination of No Historic Properties Affected on January 30, 2012.

## **2.0 ALTERNATIVES, INCLUDING THE PROPOSED ACTION**

### **2.1 INTRODUCTION**

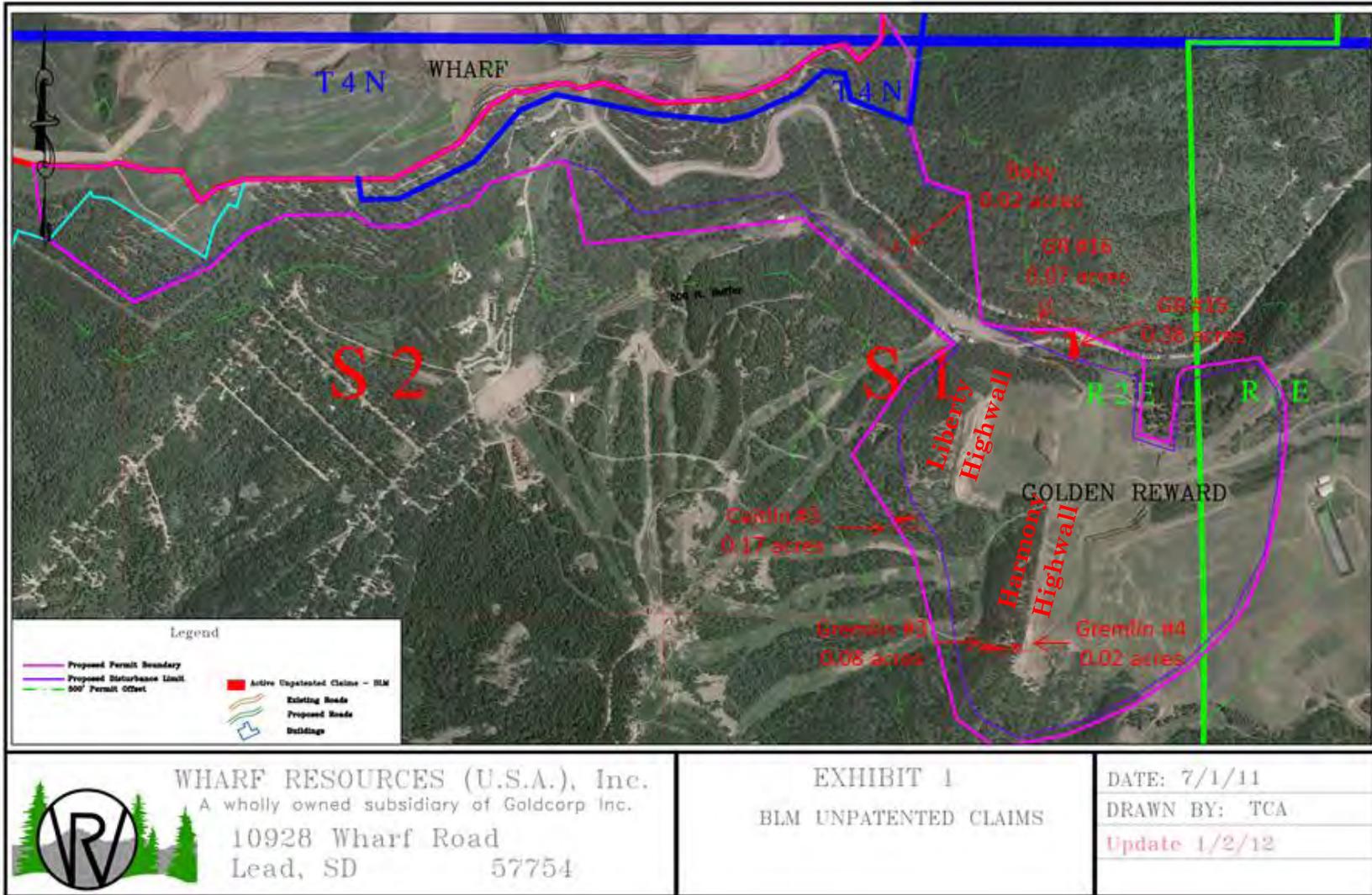
Two alternatives were considered: Proposed Action (Alternative A) and No Action (Alternative B). No other alternatives have been proposed that would meet the purpose and need for the project.

In July 2011, Wharf submitted a POO to the BLM for the purpose of surface mining 0.74 acre of federal mining claims located on BLM administered surface. The locations of the BLM mining claims within the Wharf Expansion Project are shown on Figure 2-1. Regardless of the outcome of the BLM decision, mining activity in accordance with the South Dakota LSMP issued to Wharf would be conducted on the private lands within the permit boundary.

The Expansion Project is adjacent to the existing Wharf Mine and includes areas of Golden Reward Mine that were formerly mined and reclaimed (Figure 1-2). An LSMP application was submitted in February 2011 and approved by the South Dakota Board of Minerals and Environment in November 2011. The LSMP application provides for a continuation of current operations to include an additional 279 acres of mining area, 17 acres for topsoil stockpiles, and 8 acres for haulage routes and roads. The additional mine areas would provide approximately 7 years of continuation of the current permitted life of the Wharf Mine.

### **2.2 PROPOSED ACTION (ALTERNATIVE A)**

The Proposed Action would approve the POO and be incorporated into the overall Wharf Mine Expansion Project. The Proposed Action would allow for the mining and reclamation of the 0.74 acre of BLM administered surface contained within the disturbance area of the permit boundary. The Plan of Operations calls for the surface disturbance of only 0.12 acre of BLM administered surface, which equates to less than 0.1 percent of the Expansion Project. Wharf does not intend to disturb the additional 0.62 acre inside the permit boundary at this time but may if operation plans change. Most of the affected BLM administered surface is located within Golden Reward adjacent to the Harmony Highwall area along the eastern slope of Terry Peak. The 0.74 acre of BLM administered surface within the Expansion Project are listed in Table 1-1 and shown on Figure 2-1. The LSMP application provides for a continuation of current operations to include 279 acres of mining area, 17 acres for topsoil stockpiles, and 8 acres for haulage routes and roads.



**Figure 2-1.** Bureau of Land Management Mining Claims Within the Wharf Expansion Project.

Mining in the Expansion Project, including BLM administered surface, would be an open-pit, truck-and-shovel operation with a fleet consisting of approximately nine 100-ton haul trucks; three loaders with 19 cubic yard buckets; three D9T dozers or comparable equipment; two production drills for blasting; and numerous support equipment such as blades, backhoes, excavators, and forklifts. This equipment will be used for both mine operations and reclamation activities (3809.401(b)(2 and 3)). Ore extracted from the Expansion Area would be trucked to the existing permitted Wharf Mine heap-leaching facility for processing. The operation would require modification of State Highway 473 and Lawrence County Road, the costs of which will be at Wharf's expense and subject to the approval of the South Dakota Department of Transportation (SD DOT) and Lawrence County. The Expansion Project does not require the movement or relocation of any processing equipment. Processing of gold and silver at the Wharf Mine process plant will not substantially change as a result of the Expansion Project. Ore will continue to be milled at Wharf's current processing facility. Gold bearing ore would be heap leached on existing specially designed pads. The process solution which is liquid sodium cyanide, is percolated through the ore to dissolve the gold which is then recovered from the solution via recovery circuits.

The Expansion Area is proposed to be developed in four phases. This area would be mined to a depth of 5,720-foot elevation at the deepest point, and most areas would be mined to a depth of approximately 5,900-foot elevation. As new mine areas are developed, waste rock and additional overburden material would be used to backfill previously mined areas. No spent ore would be deposited within the BLM administered surface. Reclamation of disturbed areas would be accomplished by recontouring, resoiling, and revegetating the land in accordance with accepted reclamation techniques. All fencing and gated entrances would remain for security purposes. Further reclamation details are provided in Chapter 3.0 of the Plan of Operations.

The proposed haul road would be constructed within Nevada Gulch west of where Nevada Gulch Creek runs parallel to the Terry Cemetery access road. The haul road would not cross the creek at this point but would follow the current Terry Cemetery Road into Golden Reward. A culvert will be placed at the location where the haul road enters the Ski Area parking lot to route surface drainage flowing along the south side of the Ski Area parking lot under the haul road. See Exhibit 29.1 of the Plan of Operations for details. Once mining is completed at Golden Reward, the haul road from the Terry Peak Kussy Express entrance to the Golden Reward Mine would be left in place for future use by the Terry Peak Ski Area.

The mine expansion and reclamation plans, as described in the Plan of Operations, include the removal and reclamation of highwalls located along the western edge of the Golden Reward mining operation. Both the Liberty and Harmony east-facing highwalls at the base of Terry Peak would be mined in conjunction so that proper staging of waste handling can be completed. Under the Proposed Action, the Harmony Highwall would be mined back to within 100 feet of the base lift station of the Terry Peak Ski Area Red Chairlift.. The Liberty and Harmony

highwalls would be recontoured at approximately 8 to 15 percent grade beginning at the base of the ski area and to the east, eliminating all highwalls.

### **2.3 NO ACTION (ALTERNATIVE B)**

Under the No Action alternative, surface mining would continue to take place on the private land located within the Wharf Mine Expansion Project; however, no mining activity would take place on the 0.74 acre which includes the federal mining claims on BLM administered surface. The No Action alternative provides a baseline for comparison of the impacts of the Proposed Action.

The No Action alternative would reject the Plan of Operations and the BLM mining claims would not be mined for gold as proposed. Under the No Action alternative, the BLM administered surface would be left undisturbed. Specifically, the Gremlin No. 3 and No. 4 BLM parcels located directly above the existing Harmony Highwall would be left undisturbed, and the portion of the highwall immediately adjacent to those parcels would be left in place and would not be reclaimed as planned under the Proposed Action. Additional highwalls could possibly be created immediately north and south of the BLM parcels, as Wharf mines around the BLM parcels, creating finger-like protrusions extending into the proposed mining pits.

### **3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

Several baseline investigations have been completed in the Wharf Mine area to characterize environmental resources. This chapter presents the potentially affected environment of the proposed action, which provides a baseline for comparison of environmental consequences. Following the affected environment, environmental consequences for the Proposed Action and No Action alternatives are discussed within each resource. Residual and cumulative impacts to the various resources are analyzed in Chapter 4.0.

Direct effects are those effects that result from an action at the same time and place that the action occurs. Indirect effects are effects that result from an action but occur later in time or further removed in distance but is still reasonably foreseeable. For the purposes of this document, the terms “effects” and “impacts” are synonymous.

The difference in effects between the Proposed Action and the No Action alternatives lies with the adoption of the POO. Although the Expansion Area covers 528 acres, the Proposed Action would disturb 0.12 acre of the 0.74 acre of BLM administered surface located within the Expansion Project permit boundary (see Figures 1-2 and 2-1). The Proposed Action represents about 0.1 percent of the Expansion Project, and the direct and indirect environmental consequences would be negligible for the following resources: groundwater (Section 3.4), surface water (Section 3.5), air quality (Section 3.6), wildlife and aquatics (Section 3.8), cultural resources (Section 3.9), noise (Section 3.10), land use (Section 3.12), and utilities and transportation (Section 3.14). As such, there is not a detailed discussion on direct and indirect environmental consequences for these resources. The remaining resources, which are geology and minerals (Section 3.2), soils and topography (Section 3.3), vegetation (Section 3.7), visual resources (Section 3.11), and socioeconomic impacts (Section 3.14), would have direct and indirect environmental consequences, as discussed in this chapter.

The BLM must consider potential impacts to critical elements of the affected environment. These critical elements are discussed in this chapter. Of the 14 critical elements, wetlands and riparian zones, prime and unique farmlands, areas of critical environmental concern, wild and scenic rivers, and wilderness areas do not occur within the project area and will not be discussed further.

In the following sections, “project area” refers to the general area surrounding project components associated with the existing mine and the Expansion Project areas. The general project area is shown on Figure 1-2. Study area boundaries for each discipline are based on where potential direct and indirect impacts are likely to occur. In general, the geographic boundary considered for all resources coincides with the Expansion Project boundary except where noted differently. Temporal boundaries are through final reclamation which is estimated at the year 2020.

### **3.1 GENERAL SETTING**

The existing Wharf Mine is located approximately 2.5 miles west of Lead, South Dakota, in the Bald Mountain Mining District (see Figure 1-1) in Sections 1, 2, 3, and 4, T4N, R2E, and Sections 25, 26, 33, 34, 35, and 36, T5N, R2E of the Black Hills Meridian (BHM), Lawrence County, South Dakota. Golden Reward Mine is located in Sections 1 and 12, T4N, R2E, and Sections 6 and 7, T4N, R3E of the BHM. The proposed expansion is primarily located to the south and west of the existing Wharf and Golden Reward Mines, respectively, but a small section is also located north of the Wharf Mine. The property is accessed by Wharf Road and State Highway 473 (Nevada Gulch Road), which leads west from Lead through the proposed Expansion Project. The proposed Expansion Area covers approximately 528 acres of private land, including portions in Sections 1, 2, 3, and 12, T4N, R2E, Sections 6 and 7, T4N, R3E, and Sections 33 and 36, T5N, R2E of the BHM (Figure 1-2). The BLM administered surface (0.74 acre) is located within the 528-acre Expansion Project.

### **3.2 GEOLOGY AND MINERAL RESOURCES**

The geology and mineral resources encompass the geologic formations and mineral resources within the Proposed Action area. The geographic area of analysis for geology and mineral resources is the Expansion Project boundary.

#### **3.2.1 Geology—Affected Environment**

The Wharf Mine and proposed Expansion Project are located in the north-central portion of the Black Hills uplift in western South Dakota. Within the Expansion Project, the geology consists of Precambrian metamorphic rocks overlain by sediments of the Cambrian Deadwood Formation. These rocks have been intruded by Tertiary-age igneous stocks, sills, dikes, and porphyry breccias. Mineralization in the Expansion Project is primarily within the Deadwood Formation but also in and along the Tertiary intrusions. Geology within the BLM parcels is similar to surrounding geology of the Expansion Project and the Golden Reward Mine.

The Precambrian Ellison Formation is the dominant rock unit within the area and underlies the entire project at depth. The formation consists of interbedded quartzites and phyllites that are strongly folded and foliated. Foliation dips near vertically and strikes approximately north-south. Surface exposures can be found along the western edge of the Bald Mountain area and in Nevada Gulch on the south flank of Green and Bald Mountains.

The Cambrian Deadwood Formation unconformably overlies the Precambrian and consists of quartz and limestone conglomerate, sandstone, quartzite, siltstone, shale, and limestone. Within the Wharf Expansion Area, the dominant ore host is the lower member. This member generally consists of sandy dolomite interbedded with calcareous siltstone, sandstone, quartzite, limestone, limestone conglomerate, and shale. Within the area, the Deadwood Formation is

about 400 feet thick and dips southwesterly at 6 to 15 degrees [J. M. Montgomery Engineers Inc., 1996]. Ore localization in the Deadwood Formation is primarily controlled by north-northeast-trending, subvertical fractures called “verticals.” Ore zones are best described as hydrothermal replacement deposits adjacent to the fractures.

All rock units within the project area have been intruded by a variety of igneous dikes and sills considered Tertiary in age (40 to 60 million years). The intrusions are locally subdivided into monzonite porphyry, phonolite porphyry, porphyry breccia, and trachyte. These rocks primarily intrude the Precambrian and Deadwood as sills, although dikes and stocks are also present within the area. Ore grade mineralization within porphyry units is normally restricted to portions of the thick monzonite porphyry sill. This sill is located near the top of the lower member of the Deadwood Formation.

As described in Section 2.5 of the POO, numerous samples throughout the Expansion Project were analyzed for geochemical characterization of ore and discard rock for the project. The Expansion Area geochemical database analysis consists of the following: 2,064 Acid Base Accounting samples, 464 whole rock samples, 67 Meteoric Water Mobility Tests (MWMT), and 8 humidity cell samples. This level of analysis is considered to be adequate for geochemical characterization. The physical locations of the geochemical samples are plotted on Exhibits 8 through 12 of the POO with detailed results in Appendix 4A of the POO. Results indicate acid-generating potential is generally low across the project; where small pods of potentially acid-generating material have been identified, the acid-rock drainage management plan as described in the POO (Section 2.5.3) would ensure adequate handling and blending of rock material.

### **3.2.2 Geology—Environmental Consequences**

Under the **Proposed Action** alternative, geology and mineral resource impacts from disturbance to the BLM parcels would be moderate in relation to the entire mine operation. Impacts to locatable mineral resources on the BLM administered surface would be long term and irreversible because the gold would be permanently removed from the area during the mining process. Acid-generating potential is generally low across the project; where small pods of potentially acid-generating material have been identified, the acid-rock drainage management plan would ensure adequate handling and blending of rock material and no adverse impacts are anticipated. Regarding the critical element of hazardous materials and waste, no hazardous material or spent ore would be placed within the Expansion Project mine pits (see POO section 3.2.8) on BLM administered lands.

The **No Action** alternative would not allow mining of the BLM administered surface and as such, no extraction of mineral resources would occur.

### **3.3 SOILS AND TOPOGRAPHY**

The soil resources encompass the dominant soil types and availability within the Proposed Action area. The geographic area of analysis for soil resources is roughly coincident to the Expansion Project boundary with the soil study area found on Exhibit 13 of the POO. Surface disturbance is also included under the soils resource and encompasses modifications to the land surface, including changes in topography as a result of mining and reclamation.

#### **3.3.1 Soils and Topography—Affected Environment**

Approximately 600 acres within and immediately adjacent to the Expansion Project were included in the final soil mapping. The soil mapping included descriptions of 32 soil profiles and two road cuts. A detailed report on the soils study (Appendix 4B of the POO) characterizes the project area soils in terms of topsoil salvage depths and related physical and chemical properties [BKS Environmental Associates, Inc., 2010a]. The general topography of the area ranges from valleys to steep hills and mountainous slopes. Loamy soils and deep rocky soils generally occur throughout most of the area.

Soils in the Expansion Area are typical for soils formed under a mixed coniferous and deciduous forest occurring on the mountainous hillslopes of the Black Hills and are not remarkably different from soils within other areas permitted by Wharf. Hisega loam, Goldmine loam, and Grizzly very gravelly silt loam mapping units make up a majority of the study area [BKS Environmental Associates, Inc., 2010a]. The soils map is provided on Exhibit 13 of the POO. Soils within the BLM parcels were mapped as follows:

- Grizzly very gravelly silt loam = Baby
- Goldmine loam = Caitlin No. 6, Gremlin No. 3, Gremlin No. 4
- Hisega loam = Golden Reward No. 15, Golden Reward No. 16.

Based on field observations of soil profiles, the approximate salvage depths of each map unit series ranged from 0 to 18 inches, with a recommended average topsoil salvage depth of 5.39 inches. There are no soils at the Expansion Project (including the 0.74 acre of BLM administered surface) that have a high erosion potential or low revegetation potential.

#### **3.3.2 Soils and Topography—Environmental Consequences**

Under the **Proposed Action** alternative, the direct and indirect environmental consequences for the soils resource within the BLM administered surface would be minor in relation to the entire mine operation. Soils on BLM land would be removed and temporarily stockpiled during mining. Topsoil and subsoil may be salvaged or mixed during the process in areas. All efforts will be made to segregate the topsoil from rocks, trees, and subsoil when feasible.

Once mined, the two highwalls (Harmony and Liberty) would be sloped to near final grade with remaining discard material and partial strip material from the beginning of mining of the highwall pushback. During reclamation, soil would be replaced with an average depth of 4 inches. Reclaimed slopes would be graded and shaped at a slope ratio of three horizontal to one vertical (3H:1V).

To minimize soil erosion, soil stockpiles would be revegetated if they are to remain undisturbed for more than 2 years. Revegetation would be enhanced by creating a firm but irregular seedbed. This is accomplished during the cover soil application by the action of a dozer working on a slope. After cover soil has been placed on the reclaimed area, the rough seedbed accelerates initial vegetative establishment, reduces runoff, and promotes the establishment of unique microclimates at the soil surface. While reclaimed soils are typically stable, additional erosion control measures, such as construction of ditches and culverts, silt fences, rock filters, and sediment dams, would be implemented (POO, Sections 2.4 and 4.9). All sedimentation, erosion, and drainage control structures will be left in place until vegetation is adequately established to prevent sedimentation in downstream waters.

Results of soil and vegetation reclamation at both Wharf and Golden Reward demonstrate that the soils remain productive typically without the need for amendments and fertilizers. The creation of various reclaimed proposed landforms would provide stable and functional diversity to the ecosystem that currently surrounds the proposed mine expansion.

Under the **No Action** alternative, portions of the Harmony Highwall adjacent to the 0.74-acre BLM administered surface would remain exposed and no removal or stockpiling of soil from those parcels would occur. Soils would remain as they currently exist.

### **3.4 GROUNDWATER**

Groundwater encompasses subsurface water resources, including aquifers, water supply wells, springs, and general water quality. The geographic area for baseline groundwater investigations includes the Expansion Project, Wharf Mine, and Golden Reward Mine with additional monitoring in the vicinity of Terry Peak (see Figure 1-2).

#### **3.4.1 Groundwater—Affected Environment**

The characterization of the groundwater environment was conducted for the proposed Expansion Area based on available hydrogeologic and water-quality data [Hocking, 2011]. A complete hydrogeological investigation report of the Expansion Project and surrounding area, including hydrogeologic units, groundwater occurrence, springs, potentiometric surfaces, recharge and discharge, groundwater use, water quality, and projected impacts are included in Appendix 4C of the POO.

In general, groundwater occurs in all geologic units including the Precambrian, Deadwood Formation, and Tertiary intrusions. Both the Precambrian and Tertiary rock units are not considered significant aquifers with flow dominated by secondary permeability. Hydraulic properties of the Deadwood Formation are extremely variable in the Wharf area because of varying lithology and degree of hydrothermal alteration. The Wharf area lies on a groundwater divide, with the only significant inflow into the area from precipitation recharge. Locally, the groundwater is under unconfined conditions with no known interrelationships between aquifers.

Groundwater uses in the area are related to mining, housing development, and snowmaking. A review of groundwater wells was conducted by combining Wharf's location information with SD DENR well completion report information. Within 1 mile of the Expansion Project, there are approximately 18 private water wells. The majority of private wells are residential wells located on the periphery of the Expansion Project within Nevada Gulch. Additionally, Black Hills Chairlift Company owns wells located on Terry Peak used for snowmaking. The other wells within a 1-mile radius of the Expansion Project are monitoring wells (MW) or other wells owned and operated by Wharf. There are no water supply wells within the Expansion Project or the BLM parcels. A complete table and map of all wells within a 1-mile radius of the Expansion Project is available in Appendix H of Hocking [2011] (Appendix 4C of the POO).

The occurrence of groundwater in the Expansion Project area can be evaluated through drilling and knowledge of historic underground and surface workings in the Wharf and Golden Reward mining areas. All evaluations of historic records and the results of recent drilling programs indicate this region is devoid of any significant water at the depths projected for surface mining. Water-level data collected in 2010 were used to update existing potentiometric maps of the Expansion Area. August 2010 water level measurements are provided in Appendix 4C, and a potentiometric map of the area is shown on Exhibit 20 in the POO.

Within the greater Wharf mining area, the majority of springs and seeps identified are typically dry with intermittent periods of low flows. There are springs in the area located in drainages of False Bottom Creek, Deadwood Creek, Nevada Gulch, Fantail Creek, and Stewart Gulch. One spring is located at the head of Nevada Gulch within the Expansion Project but would not be disturbed. There are no springs or seeps located on the BLM parcels. Six spring localities are currently sampled as part of Wharf's ongoing water-quality monitoring program. Results for Beaver Springs and Ross Springs were used for the baseline analysis of the Expansion Project. At both Beaver Springs and Ross Springs, most 2010 samples for metals were below detection levels, with nitrate concentrations below the surface water standard [Hocking, 2011]. There are no special hydrologic features located within the BLM parcels and the surrounding Expansion Project.

Water quality is a BLM-designated critical element. Water-quality monitoring programs have been in place at Wharf since 1985. Currently, about 52 groundwater monitoring wells are being sampled at Wharf and Golden Reward Mines. Eleven of these wells were included in the

baseline analysis of the Expansion Project. In general, the baseline groundwater-quality results indicate that water within the Expansion Project area is representative of groundwater in the area with most wells having similar concentrations of most major anions and cations, including calcium, chloride, fluoride, sodium, and sulfate. One well that stands apart from the others in terms of general water quality is SM01A, an existing Golden Reward sampling site along Nevada Gulch. SM01A generally has higher concentrations of calcium, iron, magnesium, manganese, sulfate, and anions and cations in general. Also, all samples at the Railroad MW, located on the northeastern slope of Terry Peak and hydrologically upgradient of the Expansion Project, exceeded the Environmental Protection Agency (EPA) maximum contaminant level (MCL) for arsenic with the arsenic source likely the Precambrian rock surrounding this well. A complete discussion of sampling programs, results, and statistical analysis are provided in Appendix 4C of the POO.

Baseline water quality indicates that several parameters exceed South Dakota groundwater standards. Some of these parameters, including arsenic, antimony, beryllium, copper, and a few radionuclides, are considered naturally occurring. Because of typical concern by the SD DENR, nitrate and cyanide are routinely sampled. Historical impacts to groundwater from previous mining activities are minor but are evident through temporary elevated occurrences of nitrate.

### **3.4.2 Groundwater—Environmental Consequences**

Under the **Proposed Action** alternative, the direct and indirect groundwater impacts from disturbance to the 0.74 acre of BLM administered surface are negligible and would be indistinguishable from impacts of the Expansion Area and entire Wharf and Golden Reward mining operations as the Proposed Action represents only 0.1 percent of the Expansion Project. There are no water supply wells within or immediately adjacent to the BLM administered surface or the Expansion Area [Hocking, 2010]. No spent ore or hazardous waste would be deposited on the BLM administered surface. As described in Appendix 4C of the POO, the proposed mining would not have an overall influence on groundwater flow or quality outside the Expansion Project boundaries.

The **No Action** alternative would not allow mining of the BLM administered surface. Mining within the Expansion Project adjacent to the BLM administered surface would still occur but would not have an overall influence on groundwater flow or quality outside the expansion boundaries.

## **3.5 SURFACE WATER**

Surface water includes the study of creeks, streams, impoundments, lakes, and wetlands. The geographic area for baseline surface water investigations includes the Expansion Project. Monitoring sites are located within the Expansion Project boundary or extending out to 2 miles of the Expansion Project boundary.

### **3.5.1 Surface Water—Affected Environment**

Multiple small tributaries (Deadwood Creek, Rutabaga Gulch, Nevada Gulch, Fantail Creek, Lost Camp Gulch, Annie Creek, McKinley Gulch, Calamity Gulch, Long Valley, False Bottom Creek, Whitetail Creek, Ross Valley, Stewart Gulch, and Cleopatra (Squaw) Creek) are located within or adjacent to the current Wharf and Golden Reward Mines. Eight of the fourteen tributaries listed above have proposed surface disturbance related to the Expansion Project within their drainage basins (Deadwood Creek, Nevada Gulch, Fantail Creek, Lost Camp Gulch, Stewart Gulch, Annie Creek, Long Valley, and McKinley Gulch) [McCutcheon, 2011].

The upper Fantail Creek, where mining would take place, is a dry creek and there has been no record of water flow since reclamation. Where water has been recorded for Fantail Creek within the Golden Reward property, flow is on the eastern edge immediately above and below the sand dam (near the eastern gate to Golden Reward). The flow on this section is intermittent and seasonal during large meteoric events. This section of stream would not be impacted by future mining.

Several surface water impoundments are located outside the Expansion Project, although nearly all are small, typically dry ponds. There is only one small pond located within the southeastern portion of the Expansion Project; this site is located outside of the proposed mining disturbance and would not be directly impacted by operations.

Although there are moist areas present within the various vegetation communities, there are no wetlands or riparian species or communities observed within the Expansion Project (see letter from BKS Environmental Associates in Appendix 4F of the POO). There are no special hydrologic features associated with the BLM parcels located within the Wharf Expansion Project. BLM critical elements include wetlands, floodplains, and wild and scenic rivers, none of which are present in the project area.

Water quality is a BLM designated critical element. Currently, 23 surface water monitoring sites are being sampled at the Wharf and Golden Reward Mines, 11 of which were considered baseline sites by the SD DENR for the Expansion Project [McCutcheon, 2011]. Typically, all sites are sampled four times per year; all surface water monitoring sites would continue to be sampled on a schedule established with the SD DENR. Any changes to the sites or sample parameters would be established in conjunction with the SD DENR. A complete discussion of sampling programs, results, and statistical analysis is provided in Appendix 4D of the POO.

The chemical parameters analyzed in the sampling program include standard cations and anions, metals, and other constituents of potential concern, including cyanide and nitrate. At the 11 baseline sites, all field measurements (conductivity, dissolved oxygen, pH, and temperature) have been in compliance with state criteria for the 11 baseline monitoring sites over the 1-year analysis period (October 2009 through September 2010). Two samples exceeded total suspended solids (TSS) surface water standards (set at 53 milligrams per liter (mg/L)) as a

result of spring runoff. All other criteria set by the SD DENR, including arsenic, cyanide, and selenium, were met during the baseline analysis period. Also, water quality analysis of 5 years of data (2005–2010) at baseline surface water sites indicated that all monitoring sites at the Wharf Mine were in compliance for nitrate, arsenic, cyanide, and zinc.

### **3.5.2 Surface Water—Environmental Consequences**

There are no special hydrologic features associated with the BLM parcels located within the Wharf Expansion Project. Therefore, under the **Proposed Action** alternative, the direct and indirect surface water impacts from disturbance to the BLM administered surface are negligible because the 0.74 acre of BLM lands make up less than 0.1 percent of the total Expansion Project.

The **No Action** alternative would not allow mining of the BLM administered surface; therefore, there would be negligible impact to surface water resources.

## **3.6 AIR QUALITY**

Air quality encompasses overall air quality with focus on airborne particulates resulting from blasting and other mining operations. The geographic area for air-quality investigations included the Expansion Project, Wharf Mine, and nearby surrounding areas that could be impacted.

### **3.6.1 Air Quality—Affected Environment**

Air quality related to the mining operation is regulated by the federal and state governments under the Clean Air Act and the State of South Dakota Air Quality and Mining Programs. The air-quality monitoring program is described in Section 4.3 of the POO; historical monitoring results are provided in annual reports submitted to the SD DENR and summarized in the LSMP. Air quality is a BLM-designated critical element.

Under the South Dakota Air Quality Program, operational air quality has been monitored near Wharf's surface mining operation to determine localized source-generated concentrations of airborne particulates and their trends of dispersal periodically since 1985. Specific emission types measured at the operation are primarily rock dusts generated during the handling and transporting of mined ore and rock. Historical air-quality monitoring programs have included high volume (hivol) air samplers and PM-10 particulate samplers. All PM-10 sampling was discontinued in early 2007 under the discretion of the SD DENR Air Quality Program. Existing monitoring activities conducted by Wharf personnel consisted of EPA Method 9 visible emission evaluations at the two permitted sources and the seven fugitive sources. Emissions are calculated for each permitted unit and the seven fugitive sources every month and the total emissions are reported to SD DENR.

Fugitive dust from blasting and other mining operations at the existing Wharf Mine has not been a problem to date as evidenced by existing air-quality monitoring data. During all periods of air-quality monitoring at the Wharf Mine, all particulate levels were well within both federal and South Dakota PM-10 air-quality standards. Results indicate that there has been no significant deterioration of air quality caused by the current operation since 1985. The SD DENR has not received any documented complaints about blasting practices at the Wharf Mine. Blasts with short duration, sufficient moisture content of the rocks, and particle size generally do not generate excessive dust. Current mitigation measures used at the mine include (1) visually monitoring blasts to determine if excessive dust is being generated and (2) reviewing and adjusting blasting procedures to minimize fugitive dust.

Compared to the existing Wharf Mine, the BLM parcels and the Expansion Project area have similar overburden thickness, similar production estimates, and similar mining and blasting procedures. All ore would be processed at existing facilities, and haul distances of material mined at the Golden Reward would be greater than current operations. The nearest occupied residences are located on Terry Peak at the Barefoot Condominiums and Lost Camp subdivision (Figure 1-2); mining of the Expansion Project and BLM administered surface would not result in mining any closer to residences than historic mine operations.

### **3.6.2 Air Quality—Environmental Consequences**

Monitoring results indicate that there has been no significant deterioration of air quality caused by the current operation since 1985. The **Proposed Action** affects less than 0.1 percent of the Expansion Project; therefore, the direct and indirect air-quality impacts from disturbance to the 0.74 acre of BLM administered surface are negligible.

The **No Action** alternative would not allow mining of the BLM administered surface; therefore, impacts to air-quality resources would be negligible.

## **3.7 VEGETATION**

Vegetation resources encompass existing vegetation communities, including species type and relative abundance and threatened, endangered, and sensitive plant species. The geographic area for vegetation investigations included the Expansion Project, Wharf Mine, and Golden Reward Mine.

### **3.7.1 Vegetation—Affected Environment**

A baseline vegetation study, including vegetative inventories, plant cover, and density surveys, was performed in 2010 by BKS Environmental Associates on the Expansion Project, including the BLM administered surface. Typically in undisturbed areas, the vegetation is

native; areas of disturbance and reclamation at Golden Reward and Terry Peak may contain both native and nonnative species. There are no invasive species recorded within the expansion project, and wharf has an active noxious weed control plan (see POO section 3.2.7.4). the complete vegetation report is available in appendix 4F of the POO.

Four primary vegetation communities exist in the Expansion Area: ponderosa pine–common snowberry, ponderosa pine–creeping juniper, quaking aspen series, and reclaimed grassland. Each of these communities was examined as a part of the baseline vegetation study for the SD DENR Mine Permit application [BKS Environmental Associates, Inc., 2010b] and is discussed in detail in Appendix 4F of the POO. Species composition and relative abundance is also described. Specifically within the BLM parcels, the only vegetation communities are ponderosa pine–creeping juniper (Baby, Golden Reward #15, Golden Reward #16) and ponderosa pine–common snowberry (Caitlin #3, Gremlin #3, Gremlin #4).

The ponderosa pine–common snowberry communities are dominated by ponderosa pine, common snowberry, and quaking aspen. The ponderosa pine–creeping juniper communities are dominated by ponderosa pine and creeping juniper. The quaking aspen communities contain quaking aspen, ponderosa pine, and grouse whortleberry. The majority of the area is covered by the ponderosa pine–common snowberry and ponderosa pine–creeping juniper communities. The ponderosa pine–common snowberry has the highest total vegetation cover, with the highest total cover in the quaking aspen series and the ponderosa pine–common snowberry communities. The highest and lowest shrub densities are in the ponderosa pine–common snowberry community and the reclaimed grassland community, respectively. Trees are the densest in the quaking aspen series.

Outside of the pit highwalls, most of the Golden Reward area consists of open meadows with interspersed cover [Environmental Resources Management, 2009]. The 2006 revegetative evaluation at Golden Reward identified 72 taxa, including 21 grass or grass-like species, 28 forbs, and 23 shrubs or trees. A full list of observed plant species is in the reclamation release request [Cedar Creek Associates, 2008]. No riparian or wetland vegetation species or communities were documented within the BLM parcels or Expansion Project. A letter from BKS Environmental Associates stating such is provided at the end of Appendix 4F of the POO.

Threatened and endangered species review is a BLM-designated critical element. The state of South Dakota has only one federally listed threatened plant species, the Western Prairie Fringed Orchid (*Platanthera praeclara*). The results of the field surveys in 2010 found no individuals or suitable habitat of the Western Prairie Fringed Orchid or any other state or federally listed threatened or endangered plant species within or adjacent to the Expansion Area. The results of the 2010 field surveys found two sensitive species or species of local concern within or adjacent to the Wharf Expansion Area [BKS Environmental Associates, 2010c]. Four populations of mountain huckleberry (*Vaccinium membranaceum*) and one population of white veined wintergreen (*Pyrola picta*) were identified. The single individual of

white veined wintergreen found within the Expansion Area was located south of the Red Chair ski lift at Terry Peak. Of the four populations of mountain huckleberry found within the Expansion Area, three are located near the Red Chair ski lift at Terry Peak. Each mountain huckleberry population group contained from 100 to over 300 plants. None of these sensitive populations are inside the BLM parcels and all are outside the proposed disturbed area and are not anticipated to be impacted. Refer to Appendix 4F (Addendum J) of the POO for a more detailed report of these sensitive species; sensitive plant species locations are also shown on Exhibit 17 of the POO.

### **3.7.2 Vegetation—Environmental Consequences**

Under the **Proposed Action** alternative, the direct and indirect environmental consequences for the vegetation resource to the 0.74 acre of BLM administered surface would be short term and minor as the Proposed Action represents only 0.1 percent of the Expansion Project. Impacts from disturbance to the BLM administered surface would include harvesting of trees and stripping of vegetation similar to the adjacent Expansion Project lands. Reclamation of disturbed areas would be accomplished by recontouring, resoiling, and revegetating the land in accordance with accepted reclamation techniques. An active noxious weed control plan will be continue to be implemented. No threatened, endangered, or sensitive species or riparian areas are located on the BLM administered surface.

The **No Action** alternative would not allow mining of the BLM administered surface and as such, no removal or disturbance of vegetation on the BLM parcels would occur.

## **3.8 WILDLIFE AND AQUATIC RESOURCES**

Wildlife and aquatic resources encompass animal occurrence, diversity, and habitat. For the Expansion Project area, particular interest was given to bats, raptors, owls, aquatic species, and other species of federal or state interest. The baseline monitoring boundary extended 0.5 mile beyond the Expansion Boundary with aquatic sampling on drainages also extending approximately 2 miles beyond the Expansion Project boundary on affected drainages.

### **3.8.1 Wildlife and Aquatic Resources—Affected Environment**

Observations of bird and wildlife activities within the mine site and adjacent surroundings have been monitored and recorded by the Wharf environmental staff since 1982. Wildlife surveys in the new Expansion Area (including the BLM parcels) and surrounding 0.5-mile perimeter were conducted from November 2009 through July 2010. The objective of the baseline wildlife study was to collect both quantitative and qualitative data on occurrence, abundance, diversity, seasonal trends, and general habitat affinity in and around the Expansion Area. Standard field guides, the U.S. Forest Service's (USFS) Region 2 Sensitive Species list [U.S. Forest Service, 2009], Bureau of Land Management Sensitive Species List [Bureau of

Land Management, 2009], and the South Dakota Natural Heritage Program [2009] list were used to identify animals and their signs. The detailed baseline wildlife report is located in Appendix 4G of the POO. Exhibit 18 in the POO shows the locations of wildlife features, including owl survey points, raptor nests, and potential bat habitat structures.

Mammals documented in the area during baseline surveys and previous years' monitoring include, but are not limited to, big game, such as deer, and elk; predators and furbearers, such as the mountain lion, coyote, raccoon, weasels, and striped skunk; and small- and medium-sized mammals, such as porcupine, jackrabbits, cottontails, pocket gophers, and several smaller rodent species. A wide variety of common avian species are also present in the area either as seasonal or year-long residents or as migrants passing through the area. Avian species include, but are not limited to, various raptors, such as hawks, owls, eagles, and vultures; woodpeckers, waterfowl, and shorebirds; wild turkeys and mourning doves; and numerous songbirds. Reporting of incidental wildlife sightings during the baseline sampling is included in Appendix 4G of the POO. As part of the Golden Reward reclamation release request [Environmental Resources Management, 2009], postmining wildlife studies were conducted. The 2006 data revealed the reclaimed Golden Reward area is being used primarily by big game (deer), game birds (wild turkey), and 21 species of songbirds; the area is also used to a lesser extent by predators, other mammals, raptors, waterfowl, reptiles, and amphibians [Environmental Resources Management, 2009].

As part of the SD DENR permitting process, the SD GFP was consulted in developing the baseline wildlife monitoring program and approving the wildlife survey contractors (per SDCL 45-6B-7(4)). The SD GFP has also reviewed the mining and reclamation plans.

Pursuant to ARSD 74:29:07:02(6), preventative measures to minimize harmful impacts to wildlife at the Wharf Mine include active communication between the mine operators and on-site environmental personnel, a big game fence enclosure around the process area, and frequent inspections of the process ponds. Cyanide levels in process solutions are maintained at low levels (less than 50 parts per million (ppm) weak-acid dissociable (WAD) cyanide) at locations where ponds are open. These practices would continue during the Expansion Project. In addition, Wharf personnel work closely with SD GFP personnel and wildlife consultants to address any potential harmful impacts to wildlife.

### **3.8.1.1 Bats**

During surveys conducted throughout the expansion survey area in the fall of 2009 and the spring and fall of 2010, biologists identified six locations with limited potential to serve as underground roost maternity sites or hibernacula for bats. Site assessments, in cooperation with the SD GFP and a regional bat researcher, determined that three of the sites were not suitable for roosting bats. Three nights of nocturnal surveys conducted at the three remaining sites confirmed relatively low bat use in the area [ICF International, 2010]. None of the six bat species detected were identified as federally listed species; however, the South Dakota National

Heritage Program- (SDNHP-) listed silver-haired bat, northern myotis, and Townsend's big-eared bat were detected [ICF International, 2010]. BLM-sensitive bat species include northern myotis and Townsend's big-eared bat. It was determined unlikely that any of these locations provide significant roosting habitat for bats [ICF International, 2010].

Regardless of the low-documented use at the identified underground features within the study area, the potential for future bat use could not be eliminated unless temporary closures were implemented in advance of permanent closure. Approval of the mitigation strategy was granted by the SD GFP after survey results were determined. As such, on September 14, 2010, biologists placed tarps across the entrances to the three sites determined to have potential roosting habitat. After more than a week, Wharf took measures to fill in these sites. The complete bat survey report and photographs of the sites are included in Appendix 4G of the POO.

### **3.8.1.2 Raptors**

Over the past 15 years, raptor surveys have been conducted near the Wharf and Golden Reward Mines on an annual basis. Searches for raptor nests were conducted during baseline wildlife studies within the proposed disturbance area and a 0.5-mile perimeter. The complete wildlife report, including additional details on baseline studies results and historical raptor nest territories, is provided in Appendix 4G of the POO.

Numerous raptor nests sites (current and historical) are present in the general area, but no nest sites (current or historical) exist within the proposed disturbance area associated with the Expansion Area and BLM parcels and, therefore, no nests would be physically disturbed by the proposed expansion. A review of historical raptor survey data revealed that the survey area contained 20 previously identified nests and 2 relocation mitigation nest sites [ICF International, 2010]. In 2010, only one active broad-winged hawk territory was identified. Three additional raptor species (northern harrier, sharp-shinned hawk, and red-tailed hawk) were documented within the survey area during surveys in 2009 and 2010.

### **3.8.1.3 Owls**

Only one owl species (northern saw-whet owl) was recorded during targeted nocturnal owl surveys in 2010. This owl species is relatively common in pine and mixed-forest habitats throughout the Black Hills and was heard (although not visually detected) within the expansion survey area. The only additional owl species recorded during wildlife baseline surveys in the fall of 2009 and spring, summer, and fall of 2010 was an incidental observation of a great horned owl seen during the May 2010 raptor nest searches.

### **3.8.1.4 Species of State and Federal Interest**

Threatened and endangered species review is a BLM-designated critical element. No state or federally listed threatened and endangered vertebrate species were documented within the survey area during wildlife baseline surveys conducted in the fall of 2009 or in the spring, summer, and fall of 2010, and no records exist within the historical accounts of the nearby Golden Reward and Wharf Mine annual monitoring programs [ICF International, 2010].

Seven avian species, one reptile species, and three mammal species (bats) on the SDNHP list were observed within the proposed expansion survey area during baseline wildlife surveys completed in 2009 and 2010. BLM-sensitive species list include the three-toed woodpecker, northern myotis, and Townsends's big-eared bat [Bureau of Land Management, 2009]. Cooper's hawks, sharp-shinned hawks, broad-winged hawks, and the northern saw-whet owl were documented within or near the study area [ICF International, 2010]. A single pair of American three-toed woodpeckers was observed during the May raptor nest surveys. Brown creepers and Cassin's finches were observed on multiple occasions throughout open pine habitats during the July raptor nest surveys. A single smooth green snake was observed crossing a forest trail during the May surveys. The silver-haired bat, the northern myotis, and Townsend's big-eared bat were detected during the surveys, but the absence of any collective roosting (observed or recorded) excludes the sites at which they were detected as maternity/nursery roosts. The only USFS-sensitive species documented within the study area during the 2009 and 2010 surveys was the aforementioned American three-toed woodpecker [ICF International, 2010].

### **3.8.1.5 Aquatic Resources**

Aquatic species and habitat surveys have been conducted for multiple years on streams that flow through or have drainages within the Expansion Project [GEI Consultants, Inc., 2010]. These surveys provided recent and historical data on aquatic habitat, fish populations, benthic macroinvertebrate populations, and periphyton populations for the following streams in the vicinity of the proposed Expansion Area: Annie Creek, Lost Camp Gulch, Ross Valley, Deadwood Creek, False Bottom Creek, McKinley Gulch, Cleopatra Creek, Nevada Gulch, Fantail Creek, Stewart Gulch, and Whitetail Creek.

The most recent data for these streams were collected in August 2010 as part of the Expansion Area baseline sampling plan. See Exhibit 15 in the POO for a map of aquatic sampling site locations. The field studies involved collecting, identifying, counting, weighing, and measuring fish and collecting and identifying aquatic macroinvertebrates (insects) and periphyton (attached algae) that inhabit the streams. A number of stream habitat variables, including water depth and width, amount of pool and riffle, and substrate (stream bottom) composition, were measured to determine the quality of the habitat for fish, insects, and algae.

There are no threatened, endangered, or sensitive aquatic species within or surrounding the Expansion Area. All streams are listed as having a beneficial use as fish wildlife propagation,

and as such, would be maintained at water-quality standards for such use. The detailed aquatic survey report, including a summary of historic data and detailed baseline data, is available in Appendix 4H of the POO.

### **3.8.2 Wildlife and Aquatic Resources—Environmental Consequences**

There are no threatened, endangered, or sensitive aquatic species within or surrounding the BLM parcels. No state or federally listed threatened and endangered vertebrate species were documented within the survey area in 2009 and 2010. The only USFS-sensitive species documented within the study area during the 2009 and 2010 surveys was the American three-toed woodpecker. Under the **Proposed Action** alternative, the direct and indirect wildlife and aquatic impacts from disturbance to the 0.74 acre of BLM parcels would be negligible as the Proposed Action represents only 0.1 percent of the Expansion Project. Preventative measures are in place to minimize harmful impacts to wildlife and aquatic resources at the Wharf Mine as discussed in the affected environment.. Rangeland, or woodland grazing, is the land use that Wharf has reclaimed to in the past and has provided beneficial uses such as habitat for many species. As demonstrated by the diversity of wildlife species utilizing previously restored areas at Golden Reward [Environmental Resources Management, 2009], Wharf's reclamation practices are effective at rehabilitating wildlife habitat.

The **No Action** alternative would not allow mining of the BLM administered surface. Mining of the adjacent permitted Expansion Area would continue under the No Active alternative, and impacts to wildlife and aquatic resources under the proposed action would be negligible.

## **3.9 CULTURAL RESOURCES**

Research was conducted in the vicinity of the Wharf and Golden Reward Mines, including all of the Expansion Project area, Wharf Mine, Golden Reward Mine, and some adjacent areas in association with historic and existing mining activities. Cultural resources and Native American Religious Concerns are BLM-designated critical elements discussed in this section.

### **3.9.1 Legislation and Resource Protection**

The National Historic Preservation Act of 1966, as amended, provides specific guidance to federal agencies that must consider potential effects to heritage resources as part of the agencies' management activities. These guidelines or protocols are found in Section 106 of 36 CFR 800. Federal agency heritage programs are also mandated by policies and standards set forth in the National Environmental Policy Act of 1969, Executive Order 11593 of 1971, Archaeological Resource Protection Act of 1979, the American Indian Religious Freedom Act of 1978, Native American Graves Protection and Repatriation Act of 1990, and Executive Order 13175 of November 2000.

The BLM manages and protects cultural resources on public land for the purpose of public interpretation, cultural importance to Native American Indians or other cultural groups, and for scientific research. Under Section 106 of the National Historic Preservation Act (NHPA), historic properties are evaluated for their significance or “eligibility” for nomination to the National Register of Historic Places. Potential effects to sites evaluated as eligible, potentially eligible, and Traditional Cultural Properties must be considered. Protection or mitigation treatments are used to avoid or reduce adverse effects.

A standard measure for the protection of cultural resources is intensive field inventory and site identification before the implementation of land management projects. Mitigation or protection measures such as site avoidance, capping or plating site surfaces, and altering adverse effects, are possible in consultation with the State Historic Preservation Office, interested Native American Tribes, and other applicable interested parties. Effects to sites can also be reduced or minimized through avoidance, archaeological recordation, structure recordation, interpretation, increased monitoring, and restrictive covenants.

### **3.9.2 Cultural Resources—Affected Environment**

Numerous cultural resource inventory surveys have been conducted inside the project area and adjacent areas primarily for mineral exploration activities, fuels reduction, and timber sales. According to cultural resource surveys conducted for the project expansion and previous projects, the 0.74 acres of BLM administered surface lands and adjacent areas has received 100 percent cultural resource survey coverage (according to Level III state intensive standards) by projects of Buechler [2010, 1986; and 1985] and Byrne [1994]. TRC Environmental Corporation (September 2010 and October 2010) [Luoma and Lowe, 2010; McClelland and Lowe, 2010] covered additional areas near the federal mining claims for the expansion project. In general, the majority of historic items are related to historic mining activities, railroad transportation, and community development.

BLM Project No. 12-MT040-03 and Addendum Report (1/20/2012) documents a complete Level I literature review of the BLM Federal Mineral Claims Baby, Golden Reward No. 15, Golden Reward No. 16, Caitlin No. 3, Gremlin No. 3, and Gremlin No. 4 [Shierts, 2012]. It was prepared to assist in determining how many and what types of previously documented cultural resources are located within the project perimeter [Shierts, 2012]. Eighteen cultural resource sites were found within, overlapping, or adjacent to the federal mineral claims (see Appendix C). Three federal mineral claims overlap or are located within or immediately adjacent to known cultural resource sites. These include the following:

- Caitlin No. 3 overlaps non-contributing segments or sections that are considered not eligible for the National Register, of the Burlington Railroad grade (39LA2000) and related linear ditch, Site 39LA1541, that runs parallel to the railroad grade. Site 39LA1541 has been determined not eligible for the NRHP.

- Gremlin No. 3 overlaps Site 39LA1536, a NRHP not eligible, historic earth-berm and ditch that has been previously disturbed or destroyed. It may also transect another non-contributing segment of the Burlington Railroad grade (39LA2000) that is considered not eligible for the NRHP.
- Gremlin No. 4 is between Sites 39LA1536 and 39LA2000 and it is in close proximity to Site 39LA446. Site 39LA446 is a NRHP not eligible portion of a historic railroad wye, adjacent to the rail grade of 39LA2000. All three sites have been determined not eligible or noncontributing elements because of their disturbed nature and conversion to haul roads.

According to recorded documentation for the sites and evaluations conducted in 2010, many of the sites that are located within or adjacent to the federal mining claims were heavily disturbed or destroyed by mineral exploration activities. These activities have largely affected the physical integrity of the historic properties.

Site 39LA2009 is the only historic property in the project area that offers enough physical integrity to be considered a good representative or eligible candidate for the NRHP. Site 39LA2009 is a historic railroad grade from the Freemont, Elkhorn, and Missouri Valley narrow gauge [Buechler, 1987]. The nearest BLM-administered claim to eligible Site 39LA2009 is the Golden Reward No. 16 (150 meters south). The Golden Reward No. 15 and the Baby claims are approximately 150–200 meters south and southwest. These claims are from 100 to 200 meters south of the site and will not have an effect to the significant historic property. Additional documentation on Site 39LA2009 was requested by and submitted to the State Archeological Research Center (SARC).

The BLM consulted with the South Dakota State Historic Preservation Office (SHPO). The SHPO concurred with BLM's determination of No Historic Properties Affected on January 30, 2012. As part of Wharf's LSMP, SARC reviewed the Expansion Project and concurs with the reports received addressing the noncontributing factors of the sites within the proposed project area and made a finding of no impact to cultural resources is recommended for this project. Letters from both SHPO and SARC are provided in Appendix C of this document.

The BLM provided notice of the project to ten Tribes in South Dakota, Montana, and North Dakota, on December 8, 2011. The Tribes determined that no cultural values of concern would be impacted by the proposed action.

### **3.9.3 Cultural Resources—Environmental Consequences**

There are no historic properties that are considered eligible for nomination to the National Register of Historic Places located on the 0.74 acre of BLM administered surface. Under the **Proposed Action** alternative, there will be no effect to cultural resources within this analysis area provided that all eligible and potentially eligible properties, Traditional Cultural Properties, and culturally significant areas are avoided or have mitigation measures developed

in consultation with the SHPO, Tribal Historic Preservation Officers (THPOs), Tribes, and other interested parties.

The BLM has made a recommendation to the SHPO and reached a consensus with the SHPO for Sites 39LA0446, 39LA1536, 39LA1541, and portions of Site 39LA2000, which are determined not eligible for nomination to the NRHP based on poor physical integrity (BLM letter dated 1/20/2012) and (SHPO response No. I1220004F, 1/30/2012). Pursuant to [36 CFR 800.4(d)(1)], the BLM has determined no historic properties affected for the BLM administered federal mineral claims (Baby, Golden Reward No. 15, Golden Reward No. 16, Caitlin No. 3, Gremlin No. 3, and Gremlin No. 4) as documented under BLM Project 12-MT-040-03. As a result, it is expected that no potential direct, indirect, or cumulative impacts to cultural resources will occur during implementation of this proposed action alternative.

Under the **No Action** alternative, surface mining would continue to take place on the private land located within the Wharf Mine Expansion Project; however, no mining activity would take place on the 0.74 acre, which includes the federal mineral claims on BLM administered surface. Therefore, there will be no direct effect to historic properties located within the federal mining claims. Indirect effects to historic properties may occur from natural elements or erosion under this No Action alternative.

### **3.10 NOISE**

Noise or sound encompasses background sounds that are measurable. The geographic area for baseline noise investigations included the Expansion Project and nearby commercial (Terry Peak Ski Area) and residential (Barefoot Condominiums, Lost Camp subdivision) locations.

#### **3.10.1 Noise—Affected Environment**

A recent baseline study [Kliche, 2010] was conducted to determine the current background sound levels at several areas around Wharf's current operation and the proposed Expansion Project (Appendix 4J of the POO). Eleven sound-monitoring sites include locations at Terry Peak Ski Lodge, Barefoot Condominiums, and two points along the Last Chance Trail near the Lost Camp subdivision. A summary of the data taken on four dates in 2010 compared against data collected in two previous studies indicates that the minimum reading values are within the sound level for rural area forest and/or living rooms (40 decibels (dBA)). Three readings had sound level recordings close to background rural area forest at all readings. Most of the high values of "noise" recorded at these sites were from wind, wildlife (woodpeckers), and distant traffic. The only verifiable mine activities recorded during sound monitoring were a back hoe, water truck, backup alarms, and shift changes (traffic). Results of these studies indicate that Wharf's current blasting procedures do not generate excessive dust, noise, or vibration beyond safe standards recognized by the U.S. Bureau of Mines (POO, p. 57).

Operations within the Expansion Areas are not anticipated to greatly increase noise levels. The greatest impacts to these areas of concern would likely be during blasting events. Wharf's noise mitigation plan includes quarterly monitoring of noise from blasts, incorporating topography and vegetation for natural sound buffering, and blasting only during daylight hours on weekdays. Overall, noise impacts directly related to the Expansion Project are expected to be negligible to low.

### **3.10.2 Noise—Environmental Consequences**

The proximity of existing mining operations to occupied residences and skiing facilities would not change with the **Proposed Action** as the BLM parcels are completely surrounded by allowable disturbances within the LSMP. Under the Proposed Action alternative, the direct and indirect noise impacts from disturbance to the 0.74 acre of BLM parcels would be minor as the Proposed Action represents 0.1 percent of the Expansion Project and Wharf's noise mitigation plan includes quarterly monitoring of noise from blasts, incorporating topography and vegetation for natural sound buffering, and blasting only during daylight hours on weekdays.

The **No Action** alternative would not allow mining of the BLM administered surface. However, mining of the adjacent permitted Expansion Area would continue under the No Action alternative, and impacts from noise would be minor as discussed under the Proposed Action.

## **3.11 VISUAL RESOURCES**

Visual resources encompass all the visual aspects of the topography and vegetation and how the area is viewed from public vantage points. The geographic area for the visual resources assessment was conducted for vantage points in the vicinity of Wharf and Golden Reward Mines including points at Terry Peak Ski Area and State Highway 473.

### **3.11.1 Visual Resources—Affected Environment**

The general topography of the area ranges from valleys to steep hills and mountainous slopes. The BLM parcels blend in with the surrounding landscape and have little contrast, variety, or scarcity. The current visual assessment of the Expansion Project includes images and video animation of the current and postmining landscape from several vantage points, including views of both Wharf and Golden Reward Mines. The images and video are available in Appendix 4K of the POO.

Mining in the Expansion Project may be visible from several vantage points, including the top of Terry Peak, parts of State Highway 473, and some areas of the Lost Camp subdivision. Visual impacts from the housing development would be minimal because mining would only occur north of the Portland ridgeline along this western section of the expansion. Here the ridgeline acts as a visual screening aid when viewing the operation from the Barefoot

Condominiums and Lost Camp subdivision. Visual impacts to these areas would also be minimized by the use of a 500-foot vegetation buffer zone screen. Golden Reward mining activity would be visible from the top of the Terry Peak Ski Area from the Empress Lift (Red Chair) and the Kussy Express Lift. The socioeconomic study also has shown that the visual impacts of mining activity as skiers recreate do not interfere with their participation in the sport.

### **3.11.2 Visual Resources—Environmental Consequences**

Under the **Proposed Action** alternative, short-term, temporary landforms would be created, which include stockpiles, pits, and roads. Permanent changes to landforms would also occur. After reclamation is complete, the topography would generally be more subdued, with timbered canopy hills being replaced by gentler partially vegetated slopes. The postmining reclamation could enhance the visual and aesthetic view of the site at the Golden Reward area. Reclamation plans include the removal and sloping of existing highwalls immediately adjacent to BLM parcels Gremlin #3 and #4. The planned removal and reclamation would only be possible by the disturbance of the BLM parcels under the Proposed Action. Along the Liberty Highwall and Harmony Highwall pushback, there would be a vegetation buffer zone of a minimum of 100 feet between the ski area and mining activities. The highwalls in this area would be laid back during the mining phase and reclaimed so that no highwalls would be exposed. On the BLM administered surface, mining would only take place during the off-season of skiing (April–November) to keep the visual impact to a minimum.

Under the **No Action** alternative, the BLM parcels would not be disturbed. Current operating and reclamation plans in the POO do not provide specific details of how lands would be shaped under the No Action alternative. However, without disturbance and proposed landshaping, a portion of the Harmony Highwall adjacent to the BLM administered surface would continue to be exposed and provide long-term visual discontinuity to the reclaimed landscape.

## **3.12 LAND USE**

Land use encompasses existing land uses in the area along with proposed postmining land use types. The geographic area for land use investigations included the Expansion Project, Wharf Mine, Golden Reward Mine, and immediately adjacent lands. BLM critical elements include prime and unique farmland and wilderness areas, neither of which are present in the project area.

### **3.12.1 Land Use—Affected Environment**

The Wharf Expansion Project encompasses about 528 acres, of which all but the 0.74 acre of BLM land are privately owned. The postmining land use planned is a mixture of rangeland or woodland grazing, recreation, home sites, and industrial and commercial development.

The Expansion Permit area is zoned Park Forest District (PF), Park Forest Residential (PFR), Highway Service Commercial (HSC), and Suburban Residential (SRD) under terms set forth by the Lawrence County Zoning Ordinance. Currently, there is no public access to the BLM land because the small parcels are surrounded by private land, some of which is already included within the Golden Reward Mine Permit. Because of the small and fragmented nature of the BLM parcels, these parcels currently serve as forestland.

### **3.12.2 Land Use—Environmental Consequences**

There is no current use or access to the BLM administered surface. The BLM parcels would be reclaimed the same as the surrounding lands as either recreation or woodland grazing using the approved seed mix. The woodland grazing land use that Wharf has reclaimed to in the past has provided beneficial uses such as habitat for many species, including big game. The reclamation plan is included in the POO (Chapter 3). The type of industrial use proposed for the area is development of commercial property. These properties could include lodges, condominiums, and commercial facilities relating to the outdoor recreational activities. Under the **Proposed Action** alternative, the direct and indirect environmental consequences for the land use resource to the 0.74 acre of BLM administered surface would be beneficial although negligible as the Proposed Action represents 0.1 percent of the Expansion Project.

Under the **No Action** alternative, the BLM parcels would not be disturbed. Parcels would not be open to public access.

## **3.13 UTILITIES AND TRANSPORTATION**

Utilities and transportation encompass modifications to public roads and utility lines, including water, telephone, gas, and power. The geographic area considered for utilities and transportation investigations included the Expansion Project, Wharf Mine, Golden Reward Mine, and immediately adjacent utility corridors.

### **3.13.1 Utilities and Transportation—Affected Environment**

The proposed Expansion Project would require relocation of the existing water, telephone, and gas and power lines within the Expansion Project area. To maintain service of these utilities to the various affected communities, the service lines would be rerouted (see Exhibit 22 of the POO). The proposed utility reroute would involve the following changes:

- Water—approximately 3,000 feet of new line in the rerouted access road.
- Telephone—approximately 3,000 feet of new line in the rerouted access road.
- Gas—approximately 3,000 feet of new line in the rerouted access road.
- Power—approximately 2,000 feet of new power line would be routed.

All lines would be compatible in size and quality to the existing lines. A full description can be found in Section 2.3.2 of the POO. Based on information provided in the POO, there are no utility lines within the BLM parcels.

As described in Section 2.3.1 of the POO, the operation would require modification of State Highway 473 and Lawrence County Road, the costs of which would be at Wharf's expense and subject to the approval of the SD DOT and Lawrence County. State Highway 473 would be rerouted (approximately the last 1 mile of roadway) south of the current roadway lower on the hillside of Green Mountain (see Exhibit 22 in the POO). The highway and road modification would result in surface disturbance within the Expansion Project but would not be located within a mining area. It is not anticipated that any traffic flow during construction of the new section of road would require travel off a paved road and the changeover would occur seamlessly.

A haulage road would be constructed from the Wharf Mine to the Golden Reward Mine for use of transporting ore or waste rock. The haul road would intersect State Highway 473 at the location of the new tunnel/bridge point where mine traffic would flow through the tunnel/bridge and public traffic above. The haul road would be constructed by Wharf on both sides of the tunnel/bridge and constructed by contractors managed by FMG Engineering at the location of the tunnel/bridge area. The haul road would be constructed to ensure minimal impact on drainage in this area; suitable sediment and erosional control structures would be put in place to ensure minimal impact (see Exhibit 28 in the POO). Gravel, water, road oil, and/or chemical binders would be used to reduce road dust. At present, a road to the ski lift at the northeastern base of Terry Peak crosses Golden Reward #15. None of these disturbances affect BLM lands.

### **3.13.2 Utilities and Transportation—Environmental Consequences**

No utilities or transportation alterations are anticipated on BLM administered lands. Under both the **Proposed Action** alternative and the **No Action** alternative, there would be no direct or indirect environmental consequences for the utilities or transportation resource to the 0.74 acre of BLM administered surface.

## **3.14 SOCIOECONOMICS**

Socioeconomics encompass economic, fiscal, and social impacts associated with the mining operation and its effects on the local community. Socioeconomics include employment, housing,

public services availability, and estimated tax contributions. The geographic extent of the socioeconomic assessment for the Expansion Project included economic impacts to the state level, with social resource impacts to Lawrence County, and recreational impacts limited to Terry Peak Ski Area and the Expansion Project.

### **3.14.1 Socioeconomics—Affected Environment**

A socioeconomic assessment was completed for the Expansion Project that outlines the economic, fiscal, and social impacts likely to be associated with the Wharf Expansion Project [Madden, 2010]. A copy of the socioeconomic assessment is available in Appendix 4L of the POO. The Expansion Project extends the life of the existing mining operation; therefore, total levels of employment, spending for supplies and equipment, capital investments, and other services are not projected to significantly change from levels experienced over the past 10 or 15 years. Current reserves dictate that the Expansion Project would extend the life of the Wharf Mine by 7 years until about 2020. Because the BLM parcels make up less than 1 percent of the total Expansion Project, the life of the mine is not dependent upon mining the BLM parcels.

In 2008, total employment in Lawrence County equaled 14,700. Wharf currently employs about 140 people with an estimated minor increase in employment to 155 during mining of the Expansion Project and final reclamation of the entire mine. The average payroll (excluding benefits) to Wharf employees is \$46,600. Under the assumed number of employees, the payroll over the 7 years of the extended mine life would sum almost \$50 million.

Two-thirds of all employees live within Lawrence County; the remaining employees live in nearby South Dakota counties. There is adequate housing supply in the county for any of the minor increases in employment. No new or additional public services (including water supply, sewage, and schools) are anticipated in connection with the Expansion Project.

Estimated state sales tax for the remaining life of the mine is between \$670,000 and \$902,000. Property taxes to the local school district and Lawrence County government are estimated at \$900,000 per year. Broad estimates suggest that state severance tax on gold could amount to \$1.5 to \$2.5 million per year.

In summary, the last 20 years have confirmed that ski recreation can coexist in relative harmony with nearby gold mining operations and even grow in popularity when investments are targeted to improving the skier experience on the slope.

### **3.14.2 Socioeconomics—Environmental Consequences**

Under the **Proposed Action** alternative, the majority of socioeconomic impacts from disturbance to the BLM parcels would be indistinguishable from impacts of the Expansion Area and entire mine operation.

Postmining land use plans for this area would likely result in increased recreational opportunities. At Terry Peak, removal of the Liberty and Harmony Highwalls would allow the southeastern ski runs to be extended approximately 40 percent (see Appendix 14 of the POO). Removal of these highwalls under the Proposed Action would minimize potential hazards for skiers and the public and reduce the current highwall hazards. There are plans to replace the Red Chair lift with a new high-speed lift. Trails adjacent to Terry Peak Ski Area would be open for snowmobiling, snowshoeing, biking, and hiking. Additionally, these post-mining improvements in recreational opportunities would result in an increased use of the area, an increased need for additional commercial businesses and home sites, and other interrelated economic growth. A greater portion of the recreational benefits would only be realized if the Proposed Action or POO is adopted as the plans are partially dependent upon the ability to disturb the BLM parcels, remove the existing highwalls at Golden Reward, recontour the topography, and extend the ski runs along the eastern slope of Terry Peak. Additional socioeconomic impacts from the Proposed Action would include a gain to local and regional economies in the form of local jobs and property and sales tax.

Under the **No Action** alternative, the BLM parcels would not be disturbed, but the beneficial socioeconomic impacts from the greater Expansion Project would still occur. Under the No Action alternative, the recreational benefits and associated socioeconomic benefits of extending the ski runs would not be realized. Portions of the Harmony Highwall would remain exposed, resulting in potential hazards for skiers or the public and increased current highwall hazards.

### **3.15 ENVIRONMENTAL JUSTICE**

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Environmental Justice), February 11, 1994, requires BLM and other federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations [Bureau of Land Management, 2005].

#### **3.15.1 Environmental Justice—Affected Environment**

The population of Lawrence County is 24,097 people. According to the U.S. Census Bureau [2010], population demographics for Lawrence County include 94.4 percent White; 2.0 percent American Indian and Alaska Native, 0.4 percent Black or African American, and 0.8 percent Asian, and 0.5 percent other races. The median household income for Lawrence County (2006–2010) is \$42,356 compared to of \$46,360 for the state [Madden, 2010]. The percentage of people

whose income is below the poverty level in Lawrence County is 15.3 percent compared to 13.7 percent for the state.

Wharf first became involved in mining within Lawrence County in 1974, more than 35 years ago. Wharf has maintained a relatively constant pattern of business activity in terms of employment and gold production. Business spending, employment, and household incomes have all been positively affected in local economies. Wages in the mining sector were 78 percent higher than the overall county average among all private employment in 2008, nearly twice as high as all jobs in the retail sector and 2.7 times higher than accommodation and food service workers.

From the beginning of production, Wharf has adhered to a policy of hiring the majority of their workers from the local labor pool. Turnover rates are quite low so the residency breakdown by community is quite stable over time. Slightly over two-thirds of all employees were residents of Lawrence County over the 2003 to 2008 time frame [Madden, 2010].

### **3.15.2 Environmental Justice—Environmental Consequences**

Lawrence County does not have a disproportionate share of minority populations or low-income populations. Therefore, under the **Proposed Action and No Action** alternatives, there would be no adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

## 4.0 RESIDUAL AND CUMULATIVE EFFECTS

Cumulative effects are those impacts that result from incremental impacts of an action when added to other past, present, or reasonably foreseeable actions. Cumulative effects are only considered for those resources that are (1) affected by the Expansion Project including the BLM administered surface and (2) affected by other actions whose impacts occur within the same area and time frame.

The cumulative effects on each resource brings into account not only what is happening with the Expansion Project and the BLM administered surface (POO), but also operations of the entire mine site. The cumulative impact area is typically resource-based. For this environmental assessment, cumulative impact area is defined as the boundary of the Expansion Project (Figure 1-2), unless otherwise noted below.

Cumulative impacts are described for those resources for which a direct or indirect impact has been identified. As stated in 40 CFR 1508.7: "...cumulative impacts is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes such action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time"

The impact analysis is strongly based on past, present, and future mining activities considered by the South Dakota Department of Environment and Natural Resources (SD DENR). This department has determined that past, present, and future mining activities do not exceed State or Federal Laws or Regulations. The state LSMP application was approved by the South Dakota Board of Minerals and Environment in November 2011 and the Lawrence County Office of Planning and Zoning in June 2011. After approval of the hearing findings of fact and the acceptance of the reclamation and post closure bonds by the board, Large Scale Mine Permit No. 476 was issued to Wharf on January 19, 2012. Many impacts have occurred at the Wharf mine and will continue to occur regardless of whether or not this 0.74 acre surface disturbance is approved. Should this action be approved by BLM it is not expected to add to any potential significant impact which may have resulted from preexisting conditions.

**Surface Water**—Baseline monitoring was conducted on Deadwood Creek, Nevada Gulch, Fantail Creek, Lost Camp Gulch, Stewart Gulch, Annie Creek, Long Valley, and McKinley Gulch. In general, sites are located within or extending out to 2 miles of the Expansion Project boundary.

**Wildlife and Aquatic Resources**—The baseline monitoring boundary extended 0.5 mile beyond the Expansion Boundary. Aquatic sampling on drainages also extended approximately 2 miles beyond the Expansion Project.

**Cultural Resources**—Research was conducted in the vicinity of the Wharf and Golden Reward Mines, including all of the Expansion Project area, Wharf Mine, Golden Reward Mine, and some adjacent areas in association with historic and existing mining activities.

**Noise**—The baseline assessment was conducted at the Wharf and Golden Reward Mine sites and nearby commercial (Terry Peak Ski Area) and residential (Barefoot Condominiums, Lost Camp subdivision) locations.

**Visual Resources**—The assessment was conducted for vantage points in the vicinity of Wharf and Golden Reward Mines, including points at Terry Peak Ski Area and State Highway 473.

**Socioeconomics**—The socioeconomic assessment for the Expansion Project included economic impacts to the state level, with social resource impacts to Lawrence County, and recreational impacts limited to Terry Peak Ski Area and the Expansion Project. Temporal boundaries considered included time through final reclamation, which is estimated at the year 2020.

#### **4.1 PAST OR PRESENT ACTIONS**

Past or present actions that affect the same environmental resources as the Expansion Project include the following:

**Mining.** Mining has been occurring in the general area for over 100 years. The Wharf and Golden Reward Mines are immediately adjacent to the Expansion Project. The Wharf Mine is actively operating while the Golden Reward Mine has largely been released from reclamation.

**Socioeconomics/Recreation.** Outdoor activity at Terry Peak Ski Area has continually increased since the 1980s, including hiking, biking, skiing, tubing, and snowmobiling.

**Land Use.** Previously disturbed mining areas within Wharf and Golden Reward Mines that have been reclaimed have been reclaimed to rangeland which is open to grazing and wildlife habitat.

## 4.2 REASONABLY FORESEEABLE ACTIONS

The following reasonably foreseeable actions that could cumulatively affect the same environmental resources as the Expansion Project include the following:

**Mining.** Presently, future exploration activities or additional expansion is minimal. The change in geology, project economics, and the fact that adjoining areas have been previously mined limit the potential for any future expansion. Future exploration activities within the confines of the proposed Expansion Area would focus on the perimeter of the designed pit and pit bottom to fully identify economic mineralization. There are no other known mining projects or development activities in the vicinity of the Wharf Mine or Lawrence County.

**Socioeconomics/Recreation.** Postmining land use plans include improved and additional winter recreational opportunities that could increase recreational use of the area. Proposed actions include extended ski runs, new chair lifts, and new trails for snowmobiles, and cross-country skiing.

**Development.** Postmining land use plans for the Expansion Project include allowing the reclaimed mine land to be open to developers for home sites and industrial (retail) use.

**Land Use.** The majority of lands currently disturbed by mining operations at Wharf Mine and portions of the Expansion Project would be reclaimed to a rangeland land use type.

**Private Land Actions.** Almost all of the lands within the Expansion Project and adjacent to the BLM parcels are private. These private lands could be modified or developed within the cumulative impact assessment areas as long as local and state regulations are adhered to.

**Transportation.** As part of the Expansion Project, Wharf would relocate the upper 1 mile of Nevada Gulch Road between U.S. Highway 14A and Terry Peak and construct a new haul road connecting the Wharf and Golden Reward Mines.

## 4.3 RESIDUAL AND CUMULATIVE EFFECTS

The area surrounding the BLM administered surface has been affected by mining operations for over 100 years. The development and operation of Wharf and Golden Reward Mines have disturbed approximately 1,700 acres, 800 of which have been fully reclaimed. The Expansion Project would disturb an additional 279 acres (including 0.74 acre of BLM affected surface). The Proposed Action alternative affects less than 0.1 percent of the Expansion Project; however, combined with the current mining operation and expansion project, there are residual and cumulative effects, as described below.

**Geology and Mineral Resources.** The removal of locatable minerals combined with past mining (Wharf, Golden Reward) would be a cumulative loss to mineral resources but a gain to local and regional economies in the form of local jobs and property tax and sales tax.

**Soils and Topography.** Stockpiled soil within the disturbance areas of the Expansion Project and current operations would be exposed to wind and water that would contribute to soil erosion. Soil stripping, handling, and replacement, along with erosion control measures and revegetation as described in the POO, would ensure minimal long-term impacts to soil resources. Reclamation plans include the replacement of subsoil and topsoil with an average replacement depth of 4 inches over the entire Expansion Project [Wharf Resources, 2011c].

The final reclamation of two highwalls (Harmony and Liberty) would create the opportunity to lengthen the current ski runs of Terry Peak on the Red Chair side and add ski runs between the Red and Blue Chair where the Liberty Highwall would be mined and reclaimed. The reclamation would minimize hazards for skiers or the public and greatly reduce the current highwall hazard. The creation of various reclaimed landforms proposed would provide stable and functional diversity to the ecosystem that currently surrounds the proposed mine expansion.

**Groundwater.** Long-term residual or cumulative impacts to the regional groundwater quality may persist within the Wharf Mine, Golden Reward Mine, and Expansion Project area. Because of natural attenuation and degradation of elements and compounds, these impacts are not anticipated to have a major effect outside of mining areas. Continuous water-quality monitoring has revealed groundwater impacts in areas that have previously been mined and backfilled with waste rock or spent ore and in areas near the process facility that have experienced spills or leaks. Examples of these impacts include increased nitrate concentrations in shallow wells immediately adjacent to backfilled areas within the Wharf Mine permit boundary. The postmining increase in nitrates is not expected to exceed the groundwater standard of 10 ppm outside the permitted mine areas.

**Surface Water.** The majority of the proposed area of disturbance associated with the Expansion Project is located within the Nevada Gulch Watershed and any hydrological impacts would likely be focused within that drainage. Based on impacts from current practices, possible impacts from expansion of the mine area could include minor decreases in flow and minor changes in water quality, similar to that already occurring at the mine site.

**Air Quality.** During all periods of air-quality monitoring at the Wharf Mine, all particulate levels were well within both federal and South Dakota PM-10 air-quality standards. Blasts with short duration, sufficient moisture content of the rocks, and particle size generally do not generate excessive dust. Current mitigation measures used at the mine include (1) visually monitoring blasts to determine if excessive dust is being generated and (2) reviewing and adjusting blasting procedures to minimize fugitive dust.

**Vegetation.** Disturbance to the Expansion Project area would include harvesting of trees and stripping of vegetation. Reclamation of disturbed areas would be accomplished by recontouring, resoiling, and revegetating the land in accordance with accepted reclamation techniques. An active noxious weed control plan would continue to be implemented.

**Wildlife and Aquatic Resources.** Given the physical and faunal characteristics of the area and the preventative measures in place to minimize harmful impacts to wildlife and aquatic resources at the Wharf Mine, there would be minimal cumulative impacts to wildlife and aquatic resources or their habitats. However, residual and cumulative effects of current mining operations include a decrease of the population of mountain suckers on Annie Creek [GEI Consultants, Inc., 2010]. In the past, Wharf has reclaimed disturbed land to a rangeland or woodland grazing land use, which has provided beneficial uses such as habitat for many species. As demonstrated by the diversity of wildlife species using previously restored areas at Golden Reward [Environmental Resources Management, 2009], Wharf's reclamation practices are effective at rehabilitating wildlife habitat. An annual monitoring program is in place.

**Cultural Resources.** Residual and cumulative effects from the mining, road construction, hauling, and reclamation include potential erosion in areas of exposed hard rock surfaces and road surfaces making a change in conditions that could lead to additional erosion from natural elements. Improving roads or vehicular access to the historic properties could promote future relic hunting and/or disturbance to contributing features and artifacts by vandals.

**Noise.** Operations within the Expansion Project area are not anticipated to greatly increase noise levels. The greatest impacts to these areas of concern would likely be during blasting events. Wharf's noise mitigation plan includes quarterly monitoring of noise from blasts, incorporating topography and vegetation for natural sound buffering, and blasting only during daylight hours on weekdays.

**Visual Resources.** There would be noticeable cumulative effects to visual resources as a result of past, present, and future mining operations and reclamation actions that have reshaped the topography and modified the vegetation. In the short term, new temporary landforms would be created, which include stockpiles, pits, and roads. Permanent changes to landforms would also occur. After reclamation is complete, the topography would generally be more subdued, with timbered canopy hills being replaced by gentler partially vegetated slopes. The postmining reclamation could enhance the visual and aesthetic view of the site at the Golden Reward area.

**Land Use.** After mining is completed, the Expansion Project area and Wharf Mine would be reclaimed to land uses approved by the SD DENR, including rangeland, recreation, industrial and commercial, and home sites. These types of reclamation would support and promote the existing commercial, recreational, and home site uses of the surrounding area. In the past,

Wharf has reclaimed disturbed land to a rangeland or woodland grazing land use, which has provided beneficial uses such as habitat for many species, including big game.

**Utilities/Transportation.** Improvements to State Highway 473 as part of the Expansion Project would provide benefits to users accessing the area for recreation or other activities. Potential benefits of the highway reconstruction may be realized because the road would be straightened and regraded to improve traffic flow and safety.

**Socioeconomics/Recreation.** The reclaimed Expansion Area, combined with the existing Terry Peak Ski Area, would increase recreational use of the area for skiing, snowmobiling, cross-country skiing, and hiking. There would be a beneficial cumulative effect on local and regional economies.

**Environmental Justice.** Wharf's longevity in the community in terms of employment and gold production would provide beneficial long-term effects to both socioeconomic conditions and environmental justice.

## 5.0 CONSULTATION AND COORDINATION

### 5.1 INTRODUCTION

A Notice of Scoping for the environmental assessment for the Wharf Expansion Project, Lawrence County, South Dakota, was issued on November 25, 2011, for a 30-day public comment period. The notice was published in the *Rapid City Journal* on November 26, 2011; a copy of the publication and all related scoping documents are provided in Appendices A and B. An agency scoping letter was issued on November 30, 2011, and was sent to government offices listed in Section 5.2. Scoping letters were also sent to ten Tribes in South Dakota, Montana, and North Dakota on December 8, 2011.

The BLM received three scoping comments (see Appendix B). The first comment was from the South Dakota Game, Fish and Parks who inquired about the subject parcels and the reason those parcels were not involved in a land exchange process. The second comment was from the Northern Cheyenne Tribe, who indicated they have no interest in the project and would like to be kept informed. The Lawrence County Commissioners submitted a letter of support for the project. No significant issues were raised during external scoping.

The South Dakota State Historic Preservation Office (SHPO) was also consulted. The SHPO concurred with BLM's determination of No Historic Properties Affected on January 30, 2012.

### 5.2 PUBLIC PARTICIPATION

The following agencies and individuals either provided comments or were provided the opportunity to comment during the scoping period.

#### Federal Offices

- U.S. Department of Interior Fish and Wildlife Service
- U.S. Department of Agriculture Natural Resources Conservation Service

#### State Agencies and Offices

- South Dakota Department of Environment and Natural Resources
- South Dakota State Historical Society
- South Dakota Department of Tourism and State Development
- South Dakota Department of Resource Conservation and Forestry
- South Dakota Department of Game, Fish and Parks
- South Dakota Archaeological Research Center

- South Dakota State Historic Preservation Office
- South Dakota Department of Health
- South Dakota Department of Education and Cultural Affairs

#### **City and County Government**

- Lawrence County Register of Deeds
- Lawrence County Conservation District

#### **Native American Tribes**

- Standing Rock Sioux Tribe
- Cheyenne River Sioux Tribe
- Ft. Peck Tribes
- Rosebud Sioux Tribe
- Northern Cheyenne Tribe
- Lower Brule Sioux Tribe
- Crow Creek Sioux Tribe
- Sisseton-Wahpeton Oyate Tribes
- Oglala Sioux Tribe
- Mandan, Hidatsa, and Arikara Affiliated Tribes

#### **Local Media**

- *Rapid City Journal*.

### **5.3 LIST OF PREPARERS**

Table 5-1 identifies the BLM Interdisciplinary Team and the consultant team who were involved in preparing this environmental assessment.

**Table 5-1. List of Bureau of Land Management and Consultant Interdisciplinary Reviewers**

<b>BLM Interdisciplinary Team</b>	
Mr. Jonathan David	Project Leader
Mr. Dan Benoit	Environmental Scientist
Ms. Marian Atkins	SD Office Field Manager
Mr. Russell Pigors	Physical Scientist
Ms. Brenda Shierts	Cultural Resources Specialist
Mr. Chuck Berdan	Wildlife Biologist
<b>Consultant Interdisciplinary Team</b>	
Ms. Crystal Hocking	Hydrogeologist
Ms. Mary Kenner	NEPA Specialist
Dr. Cheryl Chapman	NEPA Specialist

## 6.0 REFERENCES

**BKS Environmental Associates, Inc., 2010a.** *Wharf Resources (USA), Inc. 2010 Baseline Soil Assessment Wharf and Golden Reward Expansion Areas*, prepared by BKS Environmental Associates, Inc., Gillette, WY, for Wharf Resources (USA), Inc., Lead, SD, and RESPEC, Rapid City, SD.

**BKS Environmental Associates, Inc., 2010b.** *2010 Baseline Vegetation Assessment Wharf Expansion Project Regular Mine Permit Application*, prepared by BKS Environmental Associates, Inc., Gillette, WY, for Wharf Resources (USA), Inc., Lead, SD, and RESPEC, Rapid City, SD.

**BKS Environmental Associates, Inc., 2010c.** *Wharf Expansion Areas General Reconnaissance for Plant Species of Concern*, prepared by BKS Environmental Associates, Inc., Gillette, WY, for Wharf Resources (USA), Inc., Lead, SD, and RESPEC, Rapid City, SD.

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**Bureau of Land Management, 1986.** *South Dakota Resource Management Plan*, prepared by the Bureau of Land Management, Belle Fourche Field Office, Belle Fourche, SD.

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**Buechler, J. V., 1986.** *Intensive Cultural Resource Survey of Additional Claims Conducted for Moruya Gold Mines of N.A., Inc., in Lawrence County, South Dakota*, Project No. 86-33, prepared by Dakota Research Services, Rapid City, SD, for Moruya Gold Mine, SD. On file at the State Archaeological Research Center, Rapid City, SD, under report no. ALA-0119.

**Buechler, J. V., 1985.** *Cultural Resource Survey of the Golden Reward Phase IV Permit Area, Lawrence County, South Dakota*, prepared by Dakota Research Services, Rapid City, SD, for Golden Reward Mining Co, Lead, SD. On file at the State Archaeological Research Center, Rapid City, SD, under report No. ALA-0067.

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**Hocking, C. M., 2011.** *Groundwater Characterization Study of the Wharf Expansion Project Area*, RSI-2173, prepared by RESPEC, Rapid City, SD, for Wharf Resource (USA), Inc., Lead, SD.

**ICF International, 2010.** *Wharf Resources (USA), Inc.'s Wharf and Golden Reward Expansion Wildlife Baseline Report*, prepared by ICF International, Gillette, WY, for Wharf Resources (USA), Inc., Lead, SD, and RESPEC, Rapid City, SD.

**J. M. Montgomery Engineers Inc., 1996.** *Surface Water Hydrologic Characteristics of the Upper Squaw Creek, Deadwood Creek, and False Bottom Creek Watersheds*, prepared by J. M. Montgomery Engineers Inc., Boise, ID, for Wharf Resources, Lead, SD.

**Kliche, C. A., 2010.** *Background Sound-Level Study Wharf Recourses*, prepared by South Dakota School of Mines and Technology, Rapid City, SD, for Wharf Resources (USA) Inc., Lead, SD.

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**Luoma, G. and J. A. Lowe, 2010.** *A Level III Cultural Resource Inventory for Wharf Resources (USA) Inc., Wharf Golden Reward Project, Lawrence County, South Dakota*, prepared by TRC Environmental Corporation, Laramie, WY, for Wharf Resources (USA) Inc., Lead, SD.

**Madden, M. K., 2010.** *Socioeconomic Assessment Wharf Mining Co.*, prepared by M. K. Madden, Buffalo, WY, for Wharf Resources (USA), Inc., Lead, SD.

**McClelland, B. R. and J. A. Lowe, 2010.** *A Level III Cultural Resources Inventory for Wharf Resources (U.S.A.) Inc., Wharf Golden Reward Project (Tract E), Lawrence County, South Dakota, Black Hills Archaeological Region*, TRC Project 172897, prepared by TRC Environmental Corporation, Laramie, WY, for Wharf Resources (U.S.A.) Inc., Lead, SD.

**McCutcheon, C. M., 2011.** *Surface Water Characterization Study of the Wharf Expansion Project Area*, RSI-2163, Revision 1, prepared by RESPEC, Rapid City, SD, for Wharf Resources (USA), Inc., Lead, SD.

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**U.S. Forest Service, 2009.** “Region 2 Regional Forester's Sensitive Species,” Golden, CO, retrieved January 15, 2010, from the World Wide Web at <http://www.fs.fed.us/r2/projects/scp/sensitivespecies/index.shtml>

**U.S. Census Bureau, 2010.** “State and County QuickFacts,” available on the World Wide Web at <http://quickfacts.census.gov>

**Wharf Resources, 2011a.** *Wharf Expansion Project Plan of Operations*, prepared by Wharf Resources, Lead, SD, for the Bureau of Land Management, Belle Fourche, SD.

**Wharf Resources, 2011b.** *Wharf Expansion Project Conditional Use Permit Application*, Revision 1, prepared by Wharf Resources, Lead, SD, for South Dakota Department of Environment and Natural Resources, Pierre, SD.

**Wharf Resources, 2011c.** *Wharf Expansion Project Mine Permit Application*, Revision 1, prepared by Wharf Resources, Lead, SD, for South Dakota Department of Environment and Natural Resources, Pierre, SD.

**APPENDIX A**  
**SCOPING LETTERS**

## AGENCY SCOPING ADDRESS LIST

Mr. Mike Cepak  
South Dakota Department of Environment  
and Natural Resources  
Office of Minerals and Mining  
523 East Capitol  
Joe Foss Building  
Pierre, SD 57501-3181

Ms. Sheree Green  
Lawrence County Register of Deeds  
90 Sherman Street  
Deadwood, SD 57732

Mr. Jay Vogt  
South Dakota State Historical Society  
900 Governors Drive  
Pierre, SD 57501-2217

Ms. Melissa Miller  
Department of Tourism and State Development  
Office of Tourism  
Capitol Lake Plaza  
500 East Capitol  
Pierre, SD 57501

Mr. Raymond Sowers  
Department of Resource Conservation and Forestry  
Department of Agriculture  
Foss Building  
523 East Capitol Avenue  
Pierre, SD 57501-3185

Mr. Paul Caughlin  
U.S. Department of Game, Fish, and Parks  
Foss Building  
523 East Capitol Avenue  
Pierre, SD 57501-3182

Mr. Stan Michals  
SD Department of Game, Fish, and Parks  
4725 Jackson Boulevard  
Rapid City, SD 57702-4804

Mr. Mike Fosha  
Archaeological Research Center  
2425 E. St. Charles Street  
Rapid City, SD 57709-1257

SD Department of Health  
Office of Health Protection  
615 E. 4<sup>th</sup> St.  
Pierre, SD 57501-1700

SD Department of Education and Cultural Affairs  
800 Governors Drive  
Pierre, SD 57501

USDA Natural Resources Conservation Service  
Belle Fourche Service Center  
1837 5<sup>th</sup> Ave. S  
Belle Fourche, SD 57717-2086

Lawrence County Conservation District  
1140 N Main St, Suite 15  
Spearfish, SD 57783-1553

## TRIBAL SCOPING LIST

Standing Rock Sioux Tribe

Cheyenne River Sioux Tribe

Ft. Peck Tribes

Rosebud Sioux Tribe

Northern Cheyenne Tribe

Lower Brule Sioux Tribe

Crow Creek Sioux Tribe

Sisseton-Wahpeton Oyate Tribes

Oglala Sioux Tribe

Three Affiliated Tribes: Mandan, Hidatsa, and Arikara

# BLM seeks public comment on Wharf mining

Story

Discussion

Font Size: - +

Journal staff | Posted: Saturday, November 26, 2011 12:00 pm | (0) Comments

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The Bureau of Land Management South Dakota Field Office is seeking public scoping comments on Wharf Resources' Plan of Operation to surface-mine gold about 2.5 miles west of Lead.

Wharf Resources submitted a Plan of Operations to the BLM for the purpose of surface mining about 0.12 acres of federal mining claims.

In its evaluation, the BLM must analyze the environmental effects of approving the plan to comply with the National Environmental Policy Act of 1969.

A 30-day public scoping period is part of the process to prepare an Environmental Assessment pursuant to the Act.

The public scoping period begins Friday, Nov. 25, and ends Tuesday, Dec. 27.

The BLM invites the public to provide input on concerns that should be addressed. Written comments must be postmarked by Dec. 27.

The Miles City Field Office is assisting the South Dakota Field Office on this project so mail comments to: Jon David, Miles City Field Office, 111 Garryowen Road, Miles City, MT 59301-7000 or email to [j david@blm.gov](mailto:j david@blm.gov).

Your entire comment and information may be made public at any time, so consider that if you include your address, phone number, e-mail address or other personal identifying information.

For more information, contact Jon David at (406) 233-3665.

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Posted in [Lead](#), [News](#), [Local](#) on *Saturday, November 26, 2011 12:00 pm* *Updated: 1:03 pm*. | Tags: [Local News](#), [Local Government](#)

**APPENDIX B**  
**SCOPING RESPONSES**

## SCOPING RESPONSES

-----Original Message-----

From: Stan.Michals@state.sd.us [mailto:Stan.Michals@state.sd.us]

Sent: Thursday, December 01, 2011 9:02 AM

To: David, Jonathan A

Subject: FW: Notice of Public Scoping - BLM

Hi Jon,

What kept this from 3/4 a. parcel from a land exchange?

Thanks,

Stan Michals -Energy and Minerals Coordinator SD/Game, Fish and Parks

4130 Adventure Trail

Rapid City, SD 57702

Office (605)394-2589

Fax (605)394-1760

Stan.Michals@state.sd.us

**APPENDIX C**

**CULTURAL RESOURCES CONSULTATION LETTERS**